VF Gladiolus

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December, 1916 Extension Bulletin 9

Cornell Extension Bulletin

Published by the New York State College of Agriculture
at Cornell University, Ithaca, New York

A. R. Mann, Acting Director of Extension Service

Gladiolus Studies—I

Botany, History, and Evolution of the Gladiolus

Alvin C. Beal

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PREFACE

The American Gladiolus Society was organized at Boston, Massachusetts, on the 27th of May, 1910, and the first meeting was held at Rochester, New York, in August of the same year. Among the objects of the society were the following: "to establish a standard nomenclature; to test out new varieties and give them the recognition they deserve; and to disseminate information relating to this flower."

Through a cooperative arrangement between the society and Professor L. B. Judson, representing the Department of Horticulture at Cornell University, the trial grounds of the society were located at Ithaca, New York. On the resignation of Professor Judson, who was in charge of the trials, the direction of the tests devolved on Professor John Craig, who placed George J. Burt in charge of the detail work. Mr. Burt made the notes in the field during 1911, and in the greenhouse in the winter of 1911–12. Since March, 1912, A. C. Hottes has had charge of the trials, at first under the direction of Professor Craig and later under the supervision of the writer. On October 1, 1913, the Department of Floriculture at Cornell University was organized, and the gladiolus trials were continued as a part of the investigative work of the department.

All the varieties included in these studies have been tested for more than one season, and thus a more satisfactory estimate of the merits of each variety has been obtained than would otherwise have been possible. If the work has seemed prolonged, it is due in part to the unusual and unavoidable changes in its supervision, but in larger measure to the difficulty encountered in procuring stock of varieties suspected of being synonymous with the varieties already known.

The thanks of the American Gladiolus Society and of the Department of Floriculture at Cornell are due to all who have assisted in the work either by the donation of corms or by furnishing information. Those connected with the trials are indebted also to the present and the former officers of the society for their cooperation and support.

The present bulletin is intended to trace the development of the gladiolus up to the present time. Succeeding bulletins will treat of its culture and of the varieties that have been tested in the Craig gardens of the New York State College of Agriculture at Cornell University.

Alvin C. Beal,

Professor of Floricultural Investigations, Cornell University.
Chairman Nomenclature Committee, American Gladiolus Society.

CONTENTS

PAGE

Botany of the gladiolus 94
History of the genus 95
Evolution of the gladiolus 121
History of garden species 137
Hybrid gladioli 144
History of gladiolus in America 154
Bibliography of the gladiolus 163
Botanical works 163
Special works 166
History and development 168
Color plates and figures 171
Gladiolus species 171
Hybrid gladioli 175
Horticultural varieties 176
Index 183
Species 183
Groups of varieties 187
Horticultural types 187
Growers mentioned 187

GLADIOLUS GANDAVENSIS

ADAPTED FROM VAN HOUTTE'S FLORE DES SERRES ET
DES JARDINS DE L'EUROPE

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GLADIOLUS STUDIES—I

BOTANY, HISTORY, AND EVOLUTION OF THE GLADIOLUS

Alvin C. Beal

And the small wild pinks from tender
Feather-grasses peep at us
While above them burns on slender
Stems the red gladiolus.— Lord Lytton.

Among the summer garden flowers, few, if any, have made more rapid progress in popular favor in recent years than the gladiolus. The showy character of the tall spikes of flowers, their long period of bloom and comparative ease of culture, render them popular garden subjects. Popular as they now are, they deserve to be better known until they are found in every garden or dooryard where flowers are grown.

Although gladiolus blossoms have been sold on some markets for many years, it appears that only during the last fifteen years have the merits of this plant as a summer cut flower come to be known and appreciated by florists and the flower-buying public. At the present time, gladioli rank among the first of the summer cut flowers for market, their keeping qualities rendering them very satisfactory for table and other decorations.

The name *gladiolus* is variously pronounced and from time to time during the last fifty years its pronunciation has occasioned some controversy in the horticultural press. The word is a Latin diminutive of *gladius* (*a sword*) and means *little sword*. If the pronunciation follows the Latin rule, according to which derivative endings in *olus* have a short penultimate syllable, the *o* is short. Furthermore, according to the rule for Latin pronunciation, a vowel is regularly short before another vowel, which makes the *i* short. Latin dictionaries give the first vowel in *gladius* and *gladiolus* as short. The word should therefore be marked thus: glădĭŏlus.[1] The rule for accent is as follows: "Words of more than two syllables are accented upon the penult (next to the last) if that is a long syllable, otherwise upon the antepenult (second from the last)."[2] *Gladiolus*, having a short penult syllable, *o*, would have the accent on the *i*, or antepenult syllable, thus: glă-dĭ′-ŏ-lus. The plural is properly *gladioli*, although the English sometimes write it *gladioluses*.

[1] Latin pronunciation
ă as in *Cuba*
ĭ as in *cigar*
ŏ as in *obey*

English pronunciation
ă as in *fat*
ĭ as in *pin*
ŏ as in *not*

[2] Bennett, C. E. A Latin grammar. Revised edition, page 5. 1908.

BOTANY OF THE GLADIOLUS

The gladioli are cormaceous plants belonging to the family Iridaceae, which embraces more than thirty genera of ornamental plants in American culture, including Crocus, Ixia, Freesia, and Iris. Crocus and Iris are distinguished at once from Gladiolus, Ixia, and Freesia by the fact that they normally have more than one flower to a spathe. Ixia has equilateral stamens and a regular perianth, while in Freesia, Lapeyrousia, and Watsonia the style branches are bifid and the stamens unilateral. Botanists have had some difficulty in determining whether various plants of this section of the iris family belong to the genus Gladiolus, Lapeyrousia, Babiana, or Antholyza. Babiana is distinguished by its very hairy, plaited leaves, while Antholyza has the tube suddenly dilated at the middle instead of gradually widening as in the genus Gladiolus.

FIG. 3. GLADIOLUS SEGETUM

The corms of the different species of Gladiolus vary considerably in size, shape, and color. Usually the body of the corm is white, yellowish, or red, and it is covered with a brown skin. The height of the plants varies considerably, ranging from a few inches to four feet or more. The leaves, which contribute so much to the beauty of the plant, vary in length, breadth, and color, and also in number, some of the species having only two leaves while others have from four to six. The leaves are graceful, often bending backward toward their points as if to give greater prominence to the stem which arises out of them as they recurve from either side. The flowers form a spike on the summit of the stem, in some species arranged on one side of the stem only, in others on opposite sides. In the more modern cultivated varieties the flowers open so widely as to form a spike of matchless beauty.

HISTORY OF THE GENUS

The botanists and herbalists of the sixteenth and early seventeenth centuries, dealing only with the plants of Europe, did not give much attention to gladioli. Therefore little is found concerning this plant in the writings of Cordus, Clusius, the Bauhins, Dodoens, Caesalpinus, and Lobelius, and it is not until after 1750 that one finds numerous additions to the number of gladioli. The history of the plant is as follows:

Gerarde (1597)[3] mentions the following:

G. Narbonensis, French corn flag. Flowers purple and arranged on both sides of the stalk.

G. Italicus, Italian corn flag. Flowers purple, similar in form to the preceding but arranged on one side of the stalk. A variety of this has pale-colored flowers.

The other forms mentioned—*G. Lacustris*, water sword-flag (mentioned in second edition, page 105), and *G. palustris*, water gladiole—were plants belonging to different genera.

Gerarde says further:

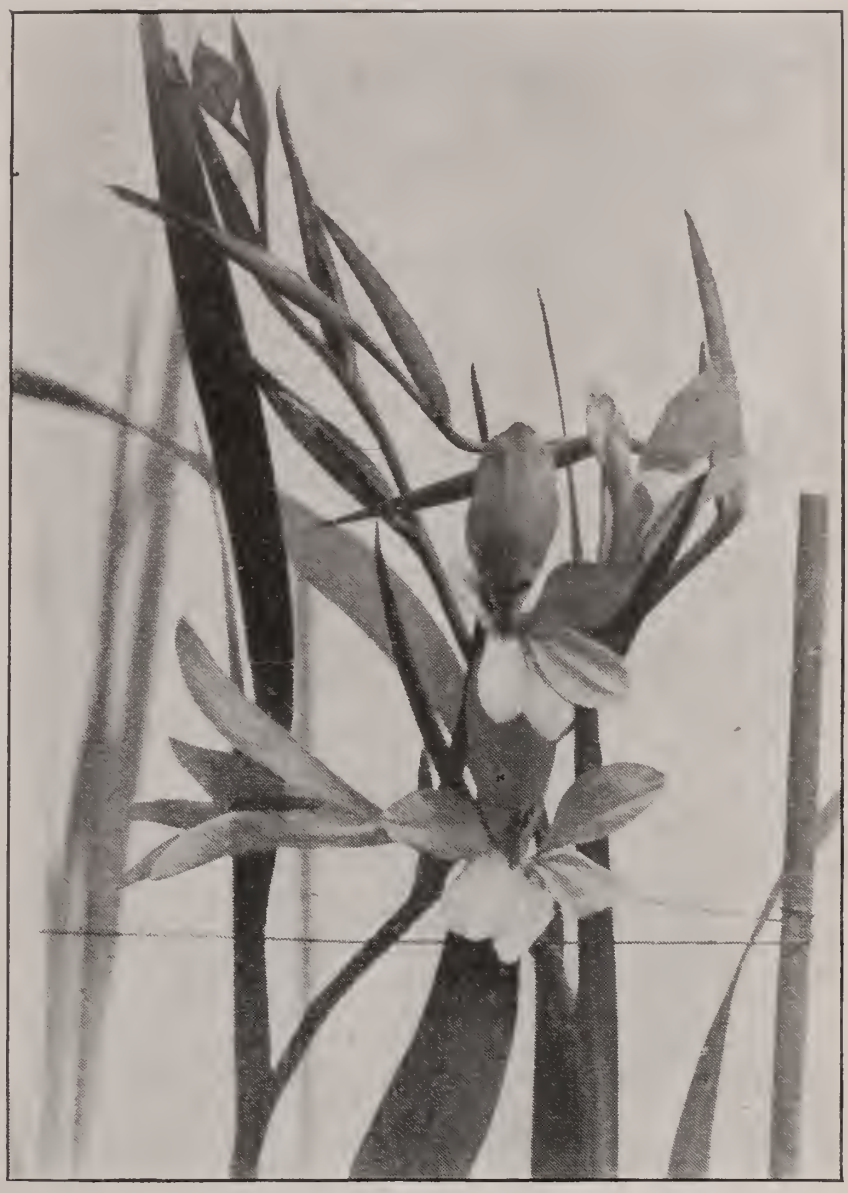

FIG. 4. FLOWER OF GLADIOLUS SEGETUM

These kinds of corne flags growe in medowes, and in eareable grounds among corne in many places of Italy, as also in the parts of Fraunce bordering thereunto. Neither are the fields of Austria and Moravia without them, as Cordus writeth. We have great plentie of them in our London gardens, especially for the garnishing and decking them up, with their seemely flowers.[4]

The gladiolus flowered from May to the end of June.

Bradley (1728) describes six forms of gladioli:

G. Narbonensis, French corn flag. Flowers reddish purple and arranged on one side of the spike.

[3] Dates in parenthesis refer to bibliography, page 163.

[4] It may be noted that Gerarde, in giving the various names of this plant, says that "Valerius Cordus calleth corne flag *Victorialis fœmina*; others *Victorialis rotunda*: In the Germanic toong, *Seigwurtz*."

G. flore rubente, Blush corn flag. Resembles the French corn-flag except that it has pale red flowers.

G. flore albo, white corn flag. Similar to the last except that the flowers are white.

G. purpureus minor, small purple corn flag. Has smaller leaves, stalk, and flowers than the French corn-flag, which it otherwise resembles. The flowers are arranged on one side of the spike.

G. Italicus, Italian corn flag. Flowers a little darker than those of the French corn-flag, and arranged on both sides of the spike.

G. Byzantinus, corn flag of Constantinople. Flowers deeper red in color and larger, and with larger roots and leaves, than the French corn flag, and arranged on one side of the spike. Blooms after the other species are past. Plant more tender than the preceding.

Breyne (1739b) describes *Gladiolus tristem*, *G. angustem*, *G. plicatum*, and *G. puniceum* Lam. The last-named is considered a synonym of *G. villosus* Ker. *G. angustus* was described in *Hortus Cliffortianus* under the name *G. foliis linearibus*.

Linnæus, in his *Hortus Cliffortianus* (1737), describes the following species and gives references to the names of these in the writings of other botanists:

1. Gladiolus foliis ensiformibus.
   Gladiolus, floribus uno versu dispositis, major. Bauh. pin. 41.
   Gladiolus sive Xyphion. Bauh. hist. 2. p. 701.
   Victorialis rotunda. Besl. eyst. 66. f. 2.
   Gladiolus, floribus uno versu dispositis, major & procerior, flore purpureo-rubente. Tournef. inst. 365, Boerh. lugdb. 2. p. 365.
   Gladiolus. Riv. mon. 163.
   Gladiolus, floribus uno versu dispositis, major & procerior, flore candicante. Tournef. inst. 365.
   Gladiolus, floribus uno versu dispositis, minor & humilior. Tournef. inst. 365.
   Gladiolus, floribus uno versu dispositis, minor. Tournef. inst. 366.
   Gladiolus carnei coloris. Tournef. inst. 365. Boerh. lugdb. 2. p. 127.
   Gladiolus utrinque floridus. Bauh. pin. 41. Boerh. lugdb. 2. p. 126.
   Gladiolus utrinque floriferus. Dod. pempt. 209.
   Gladiolus utrinque floridus, flore rubro. Tournef. inst. 366.
   Gladiolus utrinque floridus, flore albo. Tournef. inst. 366. Boerh. lugdb. 2. p. 127.
   (Native of Italy and around Monspelium.)
2. Gladiolus foliis linearibus. Vid. Tab.
   Gladiolus africanus, folio gramineo, floribus carneis, macula rhomboidea purpurea inscriptis, uno versu positis. Boerh. lugdb. 2. p. 127.
   (Native of Africa.)

In *Species Plantarum*, Linnæus (1753 b) describes the following species:

communis. 1. Gladiolus foliis ensiformibus, floribus distantibus.
Gladiolus foliis ensiformibus. *Hort. cliff.* 20. *Hort. ups.* 16.
Gladiolus caule simplicissimo, foliis ensiformibus. *Roy. lugdb.* 19.
Gladiolus floribus uno versu dispositis. *Bauh. pin.* 41.
Habitat in Europa *australi.*

imbricatus. 2. Gladiolus foliis ensiformibus, floribus imbricatis.
Habitat in Russia *citeriore.*
Flores parvi versus unum latus imbricati.

spicatus. [Not at present included in the genus Gladiolus. Is *Watsonia spicata.*]

angustus. 4. Gladiolus foliis linearibus, floribus distantibus, corollarum tubo limbis longiore.
Gladiolus caule simplcissimo, foliis linearibus, floribus alternis. *Roy. lugdb.* 19.
Gladiolus foliis linearibus. *Hort. cliff.* 20. *t. 6.
Habitat in Africa.

ramosus. [Not at present included in genus Gladiolus. Is *Melasphaerula graminea.*]

capitatus. [Not at present included in genus Gladiolus. Is *Aristea capitata.*]

The second edition (1762) includes in addition to the above:

alatus. 4. Gladiolus foliis ensiformibus, petalis lateralibus latissimis. *Amœn. acad.* 6 *afric* 2.*
Sisyrinchium viperarum. *Pluk. phyt.* 224. *f.* 8.
Habitat ad Cap. b. spei.

plicatus. [Now included in genus Babiana as *B. stricta.*]

tristis. 6. Gladiolus foliis lineari-cruciatis, corollis campanulatis.
Gladiolus bifolius & biflorus, foliis quadrangulis. *Trew. ehret. t.* 39.
Habitat in Æthiopia.

. . . . . .

alopecuroides. [Now known as *Watsonia plantaginea.*]

In the Encyclopédie Botanique (Lamarck, 1786) twenty-six species are described, but in addition to the species of Linnæus only the following are now recognized: *G. bimaculatus* [=*involutus*]; *G. puniceus* [=*villosus* (?)]; *G. luteus* Lam.; *G. montanus* Linn; and *G. recurvus.* The other species are now included in Babiana, Ixia, Lapeyrousia, Melasphaerula, and Watsonia.

John Bellenden Gawler (who later changed his name to Ker, also given in the bibliography) was the most prominent investigator working on the order Iridaceae during the first thirty or forty years of the nineteenth century. He published (Gawler, 1805) a complete synopsis of all the twenty-six genera, with a list of the two hundred and twenty-five species then known. In this paper many genera now recognized were for the first time named and fully characterized. Among these are Anomatheca, Aristea, Babiana, Geissorhiza, Hesperantha, Marica, Melasphaerula, Morphixia, Pardanthus, Sparaxis, and Tritonia. The following list of species of Gladiolus is given:[5]

Cunonia (Antholyza) B. M. t. 343.
Watsonius, B. M. t. 450.
Quadrangularis, B. M. t. 567 [Baker places this in Antholyza].
Namaquensis, B. M. t. 592 [Baker gives this as a variety of *G. alatus*].
Alatus, B. M. t. 586.
Viridis, Hort. Kew. 3 p. 481 [Ker later places this in Tritonia].
Viperatus, B. M. t. 688 [Baker gives this as a synonym of *G. orchidiflorus* Andr.].
Permeabilis, De la Roche Diss. 27.
Versicolor, B. M. t. 556 [Baker places this under *G. grandis* Thunb.].
Tristis, B. M. t. 272.
Hyalinus, Jacq. Ic. var. 2. t. 242.
Tenellus, Jacq. Ic. var. 2. t. 248. coll. 4. t. 3. f. 1.
Setifolius, Thunb. Diss. de Glad. 18.
Gracilis, B. M. t. 562.
Carinatus, B. M. t. 578 [Baker places this under *G. recurvus* Linn.].
Hirsutus [B. M. plates cited are not figures of this species].
Flexuosus, Thunb. Diss. de Glad. t. 1. f. 1 [Baker places this species in the genus Acidanthera].

[5] Citations to plates that were not later confirmed by Baker have been omitted, so that persons desiring to look up the species of Gladiolus known one hundred years ago may do so without error. The comments in brackets after some of the species, except in the first case, were added by the writer from an examination of later works on the subject.

Carneus, B. M. t. 591 [Baker regards this as a synonym of var. *ventricosus* Lam. of *G. cuspidatus* Jacq.].
Cuspidatus, B. M. t. 582.
Blandus, B. M. t. 625, 645, 648.
Angustus, B. M. t. 602.
Undulatus, B. M. t. 647.
Floribundus, B. M. t. 610.
Milleri, B. M. t. 632.
Cardinalis, B. M. t. 135.
Byzantinus, B. M. tab. nondum evulgata (347).
Communis, B. M. t. 86.
Segetum, B. M. t. 719.

For many years Ker added to the knowledge of Iridaceae through his contributions to *Curtis's Botanical Magazine*. Later he joined Sydenham Edwards in establishing the *Botanical Register*. He published separately at Brussels in 1827 a paper entitled *Genera Iridearum*, in which he gives a synoptic list of a little over three hundred species classified in thirty genera. Under *Gladiolus* he recognizes the following in addition to those named above: *speciosus* Thunb.; *merianellus* Thunb.; *villosus* Ker; *aphyllus* Ker; *brevifolius* Jacq.; *laevis* Thunb.; *Breynianus* Ker; *suaveolens* Ker; *elongatus* Thunb.; *trichonemifolius* Ker; *inflatus* Thunb.; *recurvus* Linn.; *trimaculatus* Lam.; *vomerculus* Ker; *involutus* De la Roche; *edulis* Ker; *imbricatus* Linn.; *luteus* Lam. Altogether he gives a synoptic list of forty-six species of Gladiolus, with a list of eight additional names of species doubtfully placed. With the publication of this paper the labors of this botanist on the order appear to have ceased.

After the death of Dean Herbert in 1847 there was no recognized authority on the Iridaceae for about thirty years. Dr. F. W. Klatt, of Hamburg, between 1863 and 1895 published several papers which collectively give a fairly good synopsis of the order.

In 1878 John Gilbert Baker published his *Systema Iridacearum* in the *Journal of the Linnean Society*, in which he classified about seven hundred species in sixty-five genera. His *Handbook of the Ireæ* appeared in 1892, and in this are fully described nine hundred and twenty-six species belonging to fifty-seven genera. The following generic description and list of subgenera of Gladiolus are taken from the latter work. No key is given to the one hundred and thirty-two species described, but the number of species included under each subgenus is given.

GLADIOLUS *Linn.*

Perianth-tube usually funnel-shaped; segments of the limb more or less unequal in shape and direction, oblong, spathulate or unguiculate, the upper of the outer row generally the largest. *Stamens* inserted at the throat of the perianth-tube, contiguous and arching; filaments short, free; anthers linear, basifixed. *Ovary* 3-celled; ovules many, superposed; style long, arcuate; stigmas cuneate, entire. *Capsule* oblong, loculicidally 3-celled. *Seeds* globose or discoid, sometimes distinctly winged.— *Rootstock* a tunicated corm. Produced *leaves* distichous, superposed on the stem, generally linear or ensiform. *Inflorescence* spicate; flowers 1 to a spathe, sessile; spathe-valves linear or lanceolate. *Flowers* very various in size and colour.

Subgenus EUGLADIOLUS.— Perianth-tube funnel-shaped; segments not distinctly unguiculate.
Species of Europe and Western Asia.
Seeds flat, winged.....Sp. 1–5.
Seeds globose.....Sp. 6–8.
Seeds unknown.....Sp. 9–15.
Species of the Cape and Tropical Africa.
Leaves subterete or linear.
Perianth-segments acute.....Sp. 16–31.
Perianth-segments obtuse.....Sp. 32–72.
Leaves ensiform.....Sp. 73–109.

Subgenus II. HEBEA.— Perianth-tube short; segments distinctly unguiculate. Spathes large.....Sp. 110–124.
Subgenus III. SCHWEIGGERA.— Flowers small; segments distinctly unguiculate. Spathes small.....Sp. 125–126.
Subgenus IV. HOMOGLOSSUM.— Perianth-tube like that of a Watsonia; segments subequal.....Sp. 127–132.

The following key to eighty-one of the Cape species appears in *Flora Capensis* (Baker, 1896–97). The European, Asiatic, and central African species are of course not included.

Subgenus I. EUGLADIOLUS. Spathe-valves large, green, lanceolate; perianth-segments not distinctly unguiculate.

A. Leaves terete or linear:
Perianth-segments acute:
Perianth-tube $1\frac{1}{2}$–2 in. long:
Leaves subterete:
Perianth-segments long and gradually pointed. (1) grandis.
Perianth-segments shortly pointed:
Perianth pale or slightly flushed with dark lilac..... (2) tristis.
Perianth dark lilac..... (3) recurvus.
Leaves linear:
Segments with a short cusp..... (4) angustus.
Segments with a long cusp..... (5) cuspidatus.
Perianth-tube about an inch long:
Leaves subterete:
Flowers horizontal:
Flowers pink..... (6) hastatus.
Flowers blue-lilac..... (7) gracilis.
Flowers yellowish..... (8) tenellus.
Flowers suberect..... (9) trichonemifolius.
Leaves linear:
Flowers lilac..... (10) vomerculus.
Flowers yellowish..... (11) strictus.
Whole flower not above an inch long:
Leaf with scarcely any free point..... (12) pubescens.
Leaf slender, subterete..... (13) Lambda.
Leaf linear, long..... (14) rachidiflorus.
Perianth-segments obtuse or obscurely cuspidate:
Stem-leaves with only very short, free points:
Sheaths glabrous:
Flowers pink or lilac:
Perianth-tube half as long as the segments.. (15) microphyllus.
Perianth-tube as long as the segments..... (16) brevifolius.
Perianth-tube longer than the segments..... (17) tabularis.
Flower-segments white with a red keel..... (18) inandensis
Sheaths pilose..... (19) Woodii.

Stem-leaves with long, free points:
Leaves subulate or very narrow:
Flowers erect or suberect:
Segments shorter than the tube..... (20) tenuis.
Segments equalling the tube..... (21) debilis.
Segments rather longer than the tube..... (22) Bolusii.
Segments 2–3 times the length of the tube:
Flowers bright lilac..... (23) biflorus.
Flowers pale yellow..... (24) erectiflorus.
Flowers horizontal with a curved tube:
Flowers 1–4 in a spike:
Upper segments $\frac{1}{3}$–$\frac{1}{2}$ in. broad:
Flowers white..... (25) cochleatus.
Flowers bright red..... (26) Rogersii.
Flowers pink..... (27) Pappei.
Upper segments $\frac{1}{2}$–$\frac{3}{4}$ in. broad:
Corm-tunics of fine fibres..... (28) inflatus.
Corm-tunics of wiry strands..... (29) spathaceus.
Flowers many in a spike..... (30) involutus.
Leaves linear:
Leaf-sheaths glabrous:
Perianth-tube 1 $\frac{1}{2}$ in. long..... (31) hyalinus.
Perianth-tube 1 in. long..... (32) vittatus.
Perianth-tube $\frac{3}{4}$ in. long..... (33) striatus.
Perianth tube $\frac{1}{3}$–$\frac{1}{2}$ in. long:
Segments half as long as the tube..... (34) paludosus.
Segments twice the length of the tube:
Produced leaves 2..... (35) niveni.
Produced leaves 3–4:
Stamens half as long as limb..... (36) punctatus.
Stamens as long as the lower segments (37) brachyscyphus.
Leaf-sheaths hairy..... (38) villosus.

B. Leaves ensiform.
Parviflori. Perianth-tube under an inch long.
Spikes equilateral; flowers very numerous:
Flowers red:
Perianth-tube $\frac{1}{3}$ in. long..... (39) crassifolius.
Perianth-tube $\frac{3}{4}$ in. long..... (40) Elliotii.
Flowers yellow:
Stem pubescent..... (41) Ludwigii.
Stem villose..... (42) sericeo-villosus.
Spikes secund; flowers fewer:
Flowers yellow..... (43) ochroleucus
Flowers red:
Upper segments $\frac{1}{2}$ in. broad:
Perianth-tube $\frac{1}{2}$ in. long..... (44) Kirkii.
Perianth-tube $\frac{3}{4}$ in. long..... (45) Eckloni.
Upper segments $\frac{3}{4}$ in. broad; two inner lower with a large dark blotch:
Flowers yellow..... (46) purpureo-auratus.
Flowers purple:
Outer spathe-valve 1–1 $\frac{1}{2}$ in. long..... (47) Papilio.
Outer spathe-valve 1 $\frac{1}{2}$–2 in. long..... (48) Rehmanni.
Blandi. Perianth-tube 1–2 in. long; flowers white or pale red.
Segments obovate, obscurely pointed:
Sheaths and leaves hairy:
Segments as long as the tube..... (49) hirsutus.
Segments shorter than the tube..... (50) salmoneus.
Sheaths and leaves glabrous:
Perianth-tube 1–1 $\frac{1}{4}$ in. long..... (51) scaphochlamys.
Perianth-tube 1 $\frac{1}{2}$–2 in. long..... (52) floribundus.

Segments oblong, distinctly pointed:
  Perianth-tube curved:
    Segments $\frac{1}{3}$–$\frac{1}{2}$ in. broad ..... (53) oppositiflorus.
    Segments $\frac{1}{2}$–1 in. broad ..... (54) blandus.
  Perianth-tube nearly straight:
    Segments nearly concolorous ..... (55) Milleri.
    Segments with a bright red central band ..... (56) undulatus.

Cardinales. Flowers large, bright red, with a nearly straight tube, and upper segments not distinctly hooded.

Segments subequal, shorter than the tube ..... (57) Macowani.
  Upper segments as long as the tube ..... (58) Adlami.
Segments unequal, longer than the tube:
    Upper segments $\frac{3}{4}$–1 in. broad ..... (59) cardinalis.
    Upper segments obovate, 1–1$\frac{1}{2}$ in. broad:
      Lower bracts 1$\frac{1}{2}$–2 in. long ..... (60) splendens.
      Lower bracts 3–6 in. long ..... (61) cruentus.

Dracocephali. Flowers large, with a much-curved tube and upper segments hooded.

Flowers dull-coloured:
  Leaves $\frac{3}{4}$–1 in. broad ..... (62) dracocephalus.
  Leaves 1–2 in. broad ..... (63) platyphyllus.
Flowers bright red:
  Limb shorter than the tube ..... (64) psittacinus.
  Limb as long as the tube:
    Perianth 2–3 in. long ..... (65) Leichtlinii.
    Perianth 4 in. long ..... (66) Tysoni.
  Limb longer than the tube ..... (67) Saundersii.
Flowers bright yellow ..... (68) aurantiacus.

Subgenus II. HEBEA. Spathe-valves large, green, oblong-lanceolate. Perianth-segments all with a narrow claw.

Side-segments about $\frac{1}{2}$ in. broad:
  Flowers red:
    Leaves with many close equal ribs ..... (69) alatus.
    Leaves with only a thickened midrib and edge ..... (70) spathulatus.
  Flowers greenish-yellow ..... (71) orchidiflorus.
Side-segments about $\frac{1}{3}$ in. broad:
  Flowers dull reddish ..... (72) pulchellus.
  Flowers yellowish ..... (73) bicolor.
Side-segments about $\frac{1}{4}$ in. broad:
  Stems stout; flowers few to a spike ..... (74) arcuatus.
  Stems slender; flowers many to a spike:
    Segments cuspidate:
      Upper segments 1–1$\frac{1}{4}$ in. long ..... (75) formosus.
      Upper segments $\frac{3}{4}$–1 in. long:
        Tunics of fine parallel fibres ..... (76) edulis.
        Tunics lacerated from the base ..... (77) Scullyi.
    Segments not cuspidate:
      Claw of upper segments very narrow ..... (78) Dregei.
      Claw of upper segments not very narrow ..... (79) permeabilis.

Subgenus III. SCHWEIGGERA. Spathe-valves small, brown, rigid. Segments all with a distinct slender claw and small blade.

Perianth-limb $\frac{1}{2}$–$\frac{3}{4}$ in. long. (80) arenarius.
Perianth-limb 1 in. long ..... (81) montanus.

Of the Cape species included in the foregoing key, *Gladiolus erectiflorus*, *G. inflatus*, and *G. platyphyllus* are new species and were not described in Baker's *Handbook of the Irideæ*.

Many species from other parts of the world are described in the last-named work. The fifteen European and Asiatic species are named on

pages 199 to 202. The following are from tropical Africa: *andongensis* Welw. ex Baker; *angolensis* Welw. ex Baker; *atropurpureus* Baker; *benguellensis* Baker; *brachyandrus* Baker; *brevicaulis* Baker; *Buchanani* Baker; *Buettneri* Pax; *coerulescens* Baker; *corneus* Oliv.; *decoratus* Baker; *Grantii* Baker; *gregarius* Welw.; *Hanningtoni* Baker; *kilimandscharicus* Pax; *laxiflorus* Baker; *luridus* Welw.; *Melleri* Baker; *micranthus* Baker; *multiflorus* Baker; *newii* Baker; *Oatesii* Rolfe; *pauciflorus* Baker; *primulinus* Baker; *Quartinianus* A. Rich.; *splendens* Baker; *sulphureus* Baker; *Thomsoni* Baker; *unguiculatus* Baker; *Welwitschii* Baker; *zambesiacus* Baker. From central Madagascar are reported *G. Garnieri* Klatt and *G. luteus* Lam. Further study has resulted in the discovery that *G. andongensis* Welw. ex Baker, *G. angolensis* Welw. ex Baker, *G. kilimandscharicus* Pax, *G. newii* Baker, *G. primulinus* Baker, and *G. Welwitschii* Baker, are really synonyms of *G. Quartinianus* A. Rich.

FIG. 5. GLADIOLUS LEICHTLINII BAKER

Since the publication of the *Handbook of the Irideæ* and the *Flora Capensis*, a number of species of Gladiolus from tropical Africa and elsewhere have been described. Some of these have been published by Mr. Baker and are therefore new species. Others have been described by persons who have not made any monographic studies on the genus. It is not improbable that some of them are forms of the apparently very variable *G. Quartinianus* A. Rich or of other known species. A few new specific names have appeared among the European

species, but it is not probable that the supposed new species of Jordan are more than varietal forms of species already known.

The following is a complete list of the supposed new species from Europe and Africa:

affinis De Wild.
antunesii Baker, 1897
aphanophyllus Baker, 1898
Arnoldianus De Wild.
arvaticus Jord.
atrorubens Brown, 1914
Bakeri Klatt, 1893
Baumi Harms
bellus Wright, 1906
brachylimbus Baker
brevispathus Klatt, 1893
calothyrsus Vaupel, 1912
carmineus Wright, 1906
Carsoni Baker, 1895
caudatus Baker, 1895
Conrathi Baker
cyclocarpus Jord.
cymbarinus Baker
decipiens Vaupel, 1912
densiflorus Baker
elegans Vaupel, 1912
Elloni Baker, 1890
Flanagani Baker
flexuosus Baker, 1894
fusco-viridis Baker
gallacensis Vaupel, 1912
garuanus Vaupel, 1912
Gawleri Jord.
gazensis Rendle
germanicus Jord.
glaucus Heldr., 1896
Goetzei Harms, 1900
gracillimus Baker, 1895
Hanru Jord.
Harmsianus Vaupel, 1912
heterolobus Vaupel, 1912
inconspicuus Baker
Johnstoni Baker, 1897
junodi Baker
karendensis Baker
kubangensis Harms
Lannesii Jord.
linearifolius Vaupel, 1912
littoralis Jord.
longanus Harms
Mackinderi Hook.
macrophlebius Baker, 1898
malangensis Baker
Masoniorum Wright, 1910
massoni Klatt, 1893
masukuensis Baker, 1897
micranthus Baker
microsiphon Baker
mirus Vaupel, 1912
morrumbalaensis De Wild.
mosambicensis Baker
Münzneri Vaupel, 1912
numidicus Jord.
nyikensis Baker, 1897
oliganthus Baker, 1898
oligophlebius Baker
oreocharis Schltr., 1896
pallidus Baker, 1898
platyphyllus Baker, 1893
porrigeus Jord.
pretorius Kuntze
prismatosiphon Schltr., 1899
puberulus Vaupel, 1912
pubescens Pax
punctatus Dam., 1889
quilimanensis Baker, 1898
reductus Baker
remorifolius Baker
rigescens Jord.
rigidifolius Baker
rupicola Vaupel, 1912
ruricola Jord.
Schlechteri Baker
spectabilis Baker
Staudtii Vaupel, 1912
stenophyllus Baker, 1897
subaphyllus Brown, 1909
subulatus Baker, 1898
Taubertianus Schltr., 1899
trichostachys Baker
tritoniaeformis Kuntze
tritonoides Baker, 1895
uhehensis Harms, 1900
venulosus Baker, 1897
Verdickii De Wild.
vexillare Martelli
Whytei Baker, 1897

The reader is reminded that plants of these species, as well as of the majority of the species that have been known longer, are not offered by dealers in plants — are not procurable even from botanical gardens; and that the specimens of these species are to be found in European herbaria which the writer has not had the opportunity to examine. The writer, therefore, cannot vouch for the authenticity of any of these

names as distinct species, nor can a complete key be made of all the species. It is desired, however, to call attention to the present status of the subject, and it is hoped that some person favorably located may carry forward the work so ably begun by Mr. Baker and Dr. Klatt.

The following list of synonyms is as complete as present knowledge of the genus will admit:

affinis Pers.= *cuspidatus* Jacq.
alatus Jacq.= *orchidiflorus*
albidus Jacq.= a variety of *blandus*
aleppicus Boiss.= *atroviolaceus*
algoensis Sweet = *alatus* Linn.
alpigenus C. Koch, 1848 = *illyricus*
ambiguus Roem. & Schult.= *hirsutus*
andongensis Welw. ex Baker = *Quartinianus*
Andrewsii Klatt = *brevifolius* Jacq.
angolensis Welw. ex Baker = *Quartinianus*
angustifolius Salisb.= *angustus* Linn.
angustus Herb. Linn.= *blandus, undulatus*
angustus Jacq. ex. Thunb.= *hastatus*
angustus Thunb.= *undulatus*
aphyllus Ker-Gawl., 1827 = *brevifolius*

biflorus Roem. & Schult.= *hirsutus*
bimaculatus Lam.= *involutus* De la Roche
binervis Sweet = *grandis*
Borneti Ardoino = *segetum*
Boucheanus Schlecht., 1832 = *palustris*
brevicollis Klatt = *brevifolius* Jacq.
Breynianus Ker-Gawl., 1827 = *recurvus*
byzantinus Bieb.= *segetum*
byzantinus Coss ex. Ball, 1878 = *illyricus*

calvatus Baker = a variety of *Ludwigii*
campanulatus Andr.= var. *carneus* of *G. blandus*
carinatus (Soland.) Ait.= *recurvus*
carneus Andr.= *brevifolius*
carneus De la Roche = var. *carneus* of *G. blandus*
carneus Herb. Banks = *hirsutus*
carneus Jacq.= var. *ventricosus* of *G. cuspidatus*
carneus Klatt = *Eckloni*
caucasicus Herb., 1842 = *segetum*
citrinus Klatt = *trichonemifolius*
cochleatus Baker, 1876 = *unguiculatus*
collinus Salisb.= *communis*
communis Cav.= *illyricus*
communis Linn. in part = *segetum*
communis Thunb.= *carneus*
communis Vahl. in part = *byzantinus*
commutatis Bouché = *segetum*
concolor Salisb.= var. *concolor* of *G. tristus*
Cooperi Baker = var. *Cooperi* of *G. psittacinus*
cordatus Thunb.= *angustus*
crispiflorus Herb., 1842 = *imbricatus*
cuspidatus Andr.= var. *ventricosus* of *G. cuspidatus*

dalmaticus Tausch = *segetum*
dichotomus Thunb.= *permeabilis* De la Roche
dubius Guss.= *illyricus*
dubius Parl.= *spathaceus*

elatus Balb.= *byzantinus*
elongatus Thunb.= *grandis*
ensifolius Baker = *cuspidatus* Jacq.
equitans Thunb.= var. *namaquensis* of *G. alatus*
excelsus Ker-Gawl.= *blandus*

fasciatus Roem. & Schult.= *vittatus*
festivus Herb., 1844 = *brevifolius*
flabellifer Tausch, 1836 = *oppositiflorus*
floribundus Hort. Batav. ex. Tausch = *oppositiflorus*
formosus Pers.= *striatus*

galeatus Burn.= *alatus*
galiciensis Bess.= *imbricatus*
Gawleri Klatt = a variety of *Watsonius* Thunb.
gracilis Licht.= *scaber*
grandiflorus Andr.= *floribundus*
Gueinzii Hunze, 1847 = *blandus*
Guepini Koch, 1840 = *segetum*

hastatus Ker = *vomerculus* Ker
hirsutus Ker = *villosus*
hirtus Steud.= *hirsutus*
hygrophilus Boiss. ex. Baker, 1877 = *imbricatus*

inarimensis Guss.= *segetum*
infestus Bianca = *segetum*
italicus Miller = *communis*

kilimandscharicus Pax = *Quartinianus*

laccatus Thunb.= *villosus*
laevis Thunb.= *grandis*
Lamarckii Roem. & Schult.= *villosus*
Lemonia Pourr. ex Steud.= *blandus*
leucanthus Bouché = *segetum*
libanoticus Boiss. = a variety of *imbricatus*
liliaceus Houtt.= *angustus, gracilis*, etc.
Ludoviciae Jan.= *segetum*
luridus Hornem.= *trichonemifolius*
luteus Klatt in part = *bicolor*

Macowaniensis Klatt, 1885 = *angustus*
maculatus Sweet = *recurvus* Linn.
Marchallii Poir.= *imbricatus*
monostachyus Roem. & Schult.= *hastatus*, etc.
Mortonianus Steud.= *blandus*
Mortonius Herb.= *blandus*
mucronatus Lam.= *hirsutus*

namaquensis Ker-Gawl.= var. *namaquensis* of *G. alatus*
narbonensis Bub.= *illyricus*
natalensis Reinw.= *psittacinus*
neglectus Schult = *palustris*
newii Baker = *Quartinianus*
notarisii Parl.= *communis*

odorus Salisb.= *recurvus*
oppositifolius Hort., 1893 = *oppositiflorus*
orchidiflorus Pers. non Andr.= *arenarius*
ornatus Klatt, 1885 = *inflatus*
orobranche Red. Lil.= *brevifolius* Jacq.

papilionaceus Lichtst.= *alatus* Linn.
parviflorus Jacq.= *montanus* Linn.
pauciflorus Berdaw = *imbricatus*
petraeus Boiss.= *atroviolaceus*
pictus Sweet = *blandus*
pilosus Eckl.= *villosus*
pratensis Dietr.= *palustris*
primulinus Baker, 1890 = *Quartinianus*
pterophyllus Pers.= *gracilis* Jacq.
punctatus Jacq.= *recurvus* Linn.
punctulatus Schrank, 1822 = *villosus* (?)
puniceus Lam.= *villosus* Ker

Raddeanus Trantv., 1875 = *imbricatus*
ramosus Baker = a variety of *montanus* Linn.
Reuteri Boiss.= var. *Reuteri* of *G. illyricus*
ringens Andr.= *recurvus*
ringens var. *undulatus* Andr.= *niveni* Baker
ringens Eckl.= *inflatus*
roseus Andr.= *hirsutus*
rossicus Pers.= *imbricatus*
rubromarginatus Schrad.= *hirsutus*

sagittifer Salisb.= *blandus* (?)
saltatorum Baker, 1875 = *Quartinianus*
schimperianus Steud. ex Baker, 1877 = *Quartinianus*
segetalis St. Lag.= *segetum*
serotinus Welw.= var. *Reuteri* of *G. illyricus*
serotinus Willd.= *illyricus*
setifolius Eckl.= *gracilis*
spathaceus Parl.= *segetum*
speciosus Eckl.= *cardinalis*
speciosus Thunb.= *alatus*
spilanthus Klatt in part = *brevifolius* Jacq.
spilanthus Klatt in part = *hastatus* Thunb.
spilanthus Spreng. ex Baker, 1877 = *gracilis*
spiralis Pers.= *tristis*
splendens Welw. ex Baker = *Quartinianus*
striatus Andr.= *undulatus*
strictus Jacq.= *hyalinus*
suaveolens Ker. = *recurvus*
subbiflorus Boiss.= *imbricatus*
sulcatus Lam.= *mollis*

tabularis Pers.= *montanus* Linn.
Taylorianus Rendle = *Quartinianus*
telifer Stokes = *angustus*
Templemanii Klatt, 1885 = *bicolor* Baker
tenuiflorus C. Koch, 1848 = *illyricus*
tenuis Bieb.= *imbricatus*
tenuis Salzm.= *palustris*
Thunbergii Eckl.= *hastatus*
tigrinus Eckl. ex Baker, 1877 = *vomerculus* Ker.
trimaculatus Lam.= *angustus*
triphyllus Bertol.= *palustris*
tristis Herb. Linn. ex Baker, 1877 = *grandis*
tristis Thunb.= *tenellus*

undulatus Linn. in part = *cuspidatus* Jacq.
undulatus Scheev.= *vittatus*
uniflorus Klatt, 1882 = *alatus*

ventricosus Lam.= var. *ventricosus* of *G. cuspidatus*
versicolor Andr.= *grandis*
villosiusculus Soland. ex Baker = *villosus*
vinulus Klatt, 1885 = *vittatus*
violaceus Pers.= *recurvus*
viperatus Ker-Gawl.= *orchidiflorus*
virescens Thunb.= *orchidiflorus*
vittatus Zuccag.= *undulatus* Jacq.

Welwitschii Baker, 1878 = *Quartinianus*

The following species have been described as gladioli, but belong to other genera:

abbreviatus Andr.= *Antholyza quadrangularis*
aequinoctialis Herb., 1842 = *Acidanthera aequinoctialis*
aletroides Vahl.= *Watsonia aletroides*
alopecuroides Linn.= *Watsonia plantaginea*
alopecuroides Linn.= *Watsonia spicata*
amabilis Salisb.= *Lapeyrousia juncea*
amoenus Roem. & Schult.= *Tritonia rosea*
amoenus Salisb.= *Watsonia meriana*
anceps Linn. in part = *Lapeyrousia compressa*
anceps Linn. ex. Baker, 1877 = *Lapeyrousia Fabricii*
angustifolius Lam.= *Babiana tubiflora*
antholyza Poir.= *Antholyza nervosa*

bicolor Thunb.= *Synnotia bicolor*
biflorus Thunb.= *Salemoneus biflorus*
bracteatus Thunb.= *Lapeyrousia fissifolia*
bracteolatus Lam.= *Watsonia punctata*
Burmanni Schrank, 1822 = *Ixia Burmanni*

capitatus Linn.= *Aristea capitata*
caryophyllaceus Poir.= *Watsonia humilis*
caryophylleus Houtt.= *Watsonia brevifolia*
coccineus Schrank, 1822 = *Ixia speciosa*
crispus Linn.=*Tritonia crispa*
crocatus Pers.= *Tritonia crocata*
cunonia Gaert.= *Antholyza cunonia*

denticulatus Lam.= *Lapeyrousia Fabricii*
distichus Roem. & Schult.= *Babiana distichia*

elongatus Salisb.= *Babiana tubiflora*
excisus Jacq.= *Lapeyrousia juncea*
exscapus Thunb.= *Acidanthera tubulosa*

Fabricii Thunb.= *Lapeyrousia Fabricii*
falcatus Linn.= *Lapeyrousia Fabricii*
fissifolius Jacq.= *Lapeyrousia fissifolia*
fistulosus Jacq.= *Watsonia spicata*
flavus Soland.= *Tritonia flava*
flexuosus Linn.= *Acidanthera tubulosa*
flexuosus Thunb.= *Acidanthera flexuosa*
fragrans Jacq.= *Babiana plicata*

galeatus Jacq.= *Synnotia galatea*
Garnierii Klatt (in Decken, Reis. Bot. 3:73) = *Antholyza Watsonioides*
glumaceus Thunb.= *Watsonia rosea*
gramineus Linn.= *Melasphaerula graminea*

inclinatus Red. Lil.= *Babiana tubiflora*
indicus Miller = *Ferraria undulata*
infundibuliformis Schrank, 1822 = *Watsonia meriana*
iridifolius Jacq.= *Watsonia meriana*
ixioides Thunb.= *Tritonia paniculata*

junceus Burm.= *Lapeyrousia juncea*

laccatus Jacq.= *Watsonia humilis*
laceratus Burm.= *Tritonia crispa*
latifolius Lam.= *Babiana obtusifolia*
laxus Thunb.= *Meristostigma laxa*
lineatus Salisb.= *Tritonia lineata*
lomenia J. F. Gmel.= *Lomenia borbonica*
longicollis Baker, 1876 = *Acidanthera platyphylla*
longiflorus Andr.= *Babiana tubata*
longiflorus Herb. Linn. ex Baker, 1877 = *Acidanthera tubulosa*
longiflorus Jacq.= *Tritonia pallida*
longiflorus Linn. Suppl.= *Ixia paniculata*
lucidor Baker = *Homoglossum lucidor* Baker

marginatus Linn.= *Watsonia marginata*
marmoratus Lam.= *Lapeyrousia juncea*
merianellus Thunb.= *Antholyza merianella*
merianus Thunb.= *Antholyza aletroides*
minor Baker = *Antholyza Watsonioides*
minutiflorus Schrank, 1822 = *Watsonia plantaginea*
mucronatus Jacq.= *Babiana mucronata*
mucronatus Red. Lil.= *Babiana stricta*

nanus Andr.= *Babiana rosea*
nervosus Baker = *Antholyza nervosa* Thunb.
nervosus Lam.= *Babiana stricta*

odorus Schrank = *Ixia fragrans*

paniculatus Pers.= *Lapeyrousia juncea*
papilionaceus Vahl.= *Watsonia Lamarckii*
pectinatus Soland. ex Baker, 1877 = *Tritonia crispa*
plantagineus Pers.= *Watsonia plantaginea*
plicatus Jacq.= *Babiana distichia*
plicatus Linn.= *Babiana stricta*
plicatus Thunb.= *Babiana plicata*
polystachyus Andr.= *Lapeyrousia juncea*
polystachyus Thunb.= *Babiana plicata*
Pottsii McNab = *Tritonia Pottsii*
praecox Andr.= *Antholyza revoluta*
punctatus Roem. & Schult.= *Watsonia punctata*
puniceus Vahl.= *Babiana stricta*
purpureus Vahl.= *Babiana villosa*
pygameus Roem. & Schult.= *Babiana sulphurea*
pyramidalis Andr.= *Watsonia rosea*
pyramidalis Lam.= *Watsonia iridiflora*

quadrangularis Ker-Gawl.= *Antholyza quadrangularis*

ramosus Linn.= *Melasphaerula graminea*
ramosus Murr.= *Moraea ramosa*
recurvus Houtt.= *Antholyza revoluta*
recurvus Thunb.= *Hesperantha radiata*
reflexus Lichtst.= *Babiana plicata*
refractus Jacq.= *Freesia refracta*

resubspinatus Pers.= *Freesia refracta*
ringens Thunb.= *Babiana coronata*
roseo-albus Jacq.= *Watsonia inerianus*
roseus Jacq.= *Tritonia rosea*
roseus Willd.= *Ixia amoena*
rubens Vahl.= *Watsonia punctata*
rubrocyanus Vahl.= *Babiana stricta*

secundus Thunb.= *Babiana secunda*
securiger Soland.= *Tritonia securiger*
setifolius Linn.= *Lapeyrousia juncea*
silenoides Jacq.= *Lapeyrousia silenoides*
sparmanni Thunb.= *Freesia refracta*
spatheceus Linn.= *Babiana spathacea*
spicatus Lam.= *Watsonia Lamarckii*
spicatus Linn.= *Watsonia spicata*
splendens Herb., 1843 = *Antholyza caffra*
Sprengelianus Schult.= *Watsonia stricta*
stenophyllus Schrank, 1822 = *Babiana plicata*
stoloniferous Salisb.= *Antholyza aethiopica*
striatus Herb. Banks = *Watsonia rosea*
striatus Soland. ex Baker, 1876 = *Tritonia Bakeri*
strictiflorus Delile = *Watsonia humilis*
strictus Soland.= *Babiana stricta*
subulatus Vahl.= *Watsonia punctata*
sulphureus Jacq.= *Babiana stricta*

testaceus Vahl.= *Watsonia brevifolia*
Thunbergii F. G. Diet.= *Acidanthera tubulosa*
triticeus Thunb.= *Watsonia plantaginea*
tubatus Jacq.= *Babiana tubata*
tubiflorus Linn.= *Babiana tubiflora*
tubulosus Burm.= *Watsonia spicata*
tubulosus Jacq.= *Watsonia aletroides*

venosus Willd.= *Tritonia lineata*
villosulus Roem. & Schult.= *Babiana stricta*
villosus Burm.= *Synnotia bicolor*
villosus Vahl.= *Babiana stricta*
viridis Aiton = *Tritonia viridis*

Watsonioides Baker = *Antholyza Watsonioides*
Watsonius Thunb.= *Antholyza revoluta*

xanthospilus Red. Lil.= *Freesia refracta*

Brief descriptions of some species of Gladiolus are given in the following table:

Species	Habitat	Introduced	Height (inches)	Number of flowers on a stalk	Color of flowers
alatus Linn	Cape Colony	.....	6–12	3–5	Bright red
alatus var. namaquensis Ker	Namaqualand	.....	.....	.....	
angustus Linn	Cape Colony	1756	24–36	2–6	White, three lower segments with bright purple spots
antunesii Baker, 1898	Angola	.....	18–24	.....	Purple
aphanophyllus Baker, 1898	British Central Africa	.....	6–12	.....	White
arcuatus Klatt, 1882	Little Namaqualand	.....	6	2–6	Pinkish, with a greenish tube
arenarius Baker, 1876	Cape Colony	.....	12–18	.....	Bright red or yellow
Arnoldianus De Wild., 1901	Katanga	.....	15	4–5	Violet-spotted
atropurpureus Baker, 1876	Zambezi Highlands	1876	12	6–9	Bright dark purple
atrorubens Brown, 1914	Transkei	.....	18–24	4–9	Dark red
atroviolaceus Boiss., 1853	Palestine	.....	12–18	4–8	Dark purple
aurantiacus Klatt, 1867	Natal	1886	36	12	Bright orange yellow, sometimes tinged red
aureus Baker, 1897	Cape Colony	.....	6–12	1–2	Bright yellow
bellus Wright, 1906	British Central Africa	.....	15–18	8–10	
benguellensis Baker, 1877	Angola	.....	12	6–12	Bright red, throat mottled purple on a yellow ground
bicolor Baker, 1876	Cape Colony	.....	6–9	2–3	Dull yellow
biflorus Klatt, 1885	Cape Colony	.....	6–8	2–3	Bright lilac
blandus Aiton, 1789	Cape Colony	1774	12–18	4–8	White, tinged red
Bolusii Baker, 1892	Winterhock Mountain	.....	18–24	2–4	Bright pink
brachyandrus Baker	Zambezi Highlands	1879	12	8–10	Reddish white
brachyscyphus Baker, 1892	East Griqualand	.....	18–24	2–6	Bright lilac
brevicaulis Baker, 1877	Lower Congo	.....	6–8	6–15	Dark purple
brevifolius Jacq	Cape Colony	.....	12–24	4–12	Pink or lilac, lower segments with purplish marks in throat
Buchanani Baker, 1892	Zambezi Highlands	.....	12–18	6–8	Pale red
Buettneri Pax, 1892	Togoland	.....	24–36	.....	Yellow, minutely spotted brown
byzantinus (Bauhin) Miller	Mediterranean region	.....	18–24	Many	Dark purple, lower segments with a white line down center
calothyrsus Vaupel, 1912	German East Africa	.....	36	14	Bright yellowish rose

cardinalis Curt., 1791	Cape Colony	1789	24–36	12–20	Bright scarlet, blotched white in throat
carmineus Wright, 1906	South Africa	.....	18	5	Carmine, two inner lobes with a paler spot surrounded by a darker border
caudatus Baker, 1895	British Central Africa	.....	12–18	Few	Pink
cochleatus Sweet, 1832	Lion Mountain	.....	6–18	1–2	White, with purple mark in throat
coerulescens Baker, 1877	Angola	.....	12–18	2–3	Dull purple
communis Linn	Central Europe	.....	12–18	4–8	Bright purple, lower segments with a white line down center
corneus Oliver, 1875	Lake Tanganyika	.....	24	4	Horn-colored
crassifolius Baker, 1876	Natal	.....	24–36	Numerous	Bright red
cruentus Moore, 1868	Natal	1868	24–36	6–10	Bright scarlet, lower segments with a large white blotch, and with red spots in throat
cuspidatus Jacq	Cape Colony	.....	24–36	4–8	White or pale pink, lower segments with a purple blotch
cuspidatus var. ensifolius Baker	Cape Colony	.....	.....	.....	Pink
cuspidatus var. ventricosus Lam.	Cape Colony	.....	16–20	.....	
debilis Ker, 1825	Cape Colony	.....	12–18	1–3	White, two inner segments with a lilac or claret red blotch in throat
decipiens Vaupel, 1912	Katanga	.....	36	10	Rose
decoratus Baker, 1876	Morambella	1887	24–36	6–12	Bright purple, lower segments with a very large pale blotch
deiodes Wright (G. sulphureus Baker, 1877)	German East Africa	.....	12	7–8	Bright yellow
dracocephalus Hook. f., 1871	Natal	1870	24	3–6	Yellowish green, minutely grained claret-purple
Dregei Klatt, 1863	Little Namaqualand	.....	3–6	6–9	Purple
Eckloni Lehm., 1836	Cape Colony	.....	18–36	6–12	Bright red, copiously and minutely spotted purple-red
edulis Burch., 1816	Cape Colony	.....	12–24	8–15	Pale lilac
elegans Vaupel, 1912	Nyassaland	.....	10–12	6	White
Elliotii Baker, 1891	Transvaal	.....	12	.....	Claret red
erectiflorus Baker, 1896	British Central Africa	.....	12	2–3	White, veined and flushed bright purple
Flanagani Baker, 1897	Basutoland	.....	6	3	Bright crimson
flexuosus Baker, 1894	British Central Africa	.....	12–18	Few	White, tinged dull purple
florentiae Marl., 1907	South Africa	.....	6	2–3	Bright yellow
floribundus Jacq	Cape Colony	.....	18–24	4–12	White, with a pink tinge
formosus Klatt, 1863	Cape Colony	.....	12–30	Many	Bright mauve purple
fusco-viridis Baker, 1897	South Africa	1896	18–24	10–12	Minutely striped claret-brown on a greenish ground

GLADIOLUS SPECIES (*continued*)

Species	Habitat	Introduced	Height (inches)	Number of flowers on a stalk	Color of flowers
gallaecensis Vaupel, 1912	Gallahochland	.....	36	7	Fire red
Garnieri Klatt	Madagascar	.....	18–36	4–6	Bright red
garuanus Vaupel, 1912	North Kamerun	.....	24–30	4	Yellow, dotted carmine with broad carmine stripes in throat
gazensis Rendle, 1912	Gazaland	.....	9–10	.....	Purplish rose
Goetzei Harms, 1900	Uhehe	.....	9–12	Many	Yellow, dotted red
gracilis Jacq., 1787	Cape Colony	.....	12–24	2–6	Pale lilac-blue
gracillimus Baker, 1895	British Central Africa	.....	12–18	Few	Pale lilac
grandis Thunb., 1807	Cape Colony	.....	12–24	2–6	Yellowish white, more or less tinged purple-brown
Grantii Baker, 1892	Lake Tanganyika	.....	24–36	6–8	Yellowish
gregarius Welw., 1877	Angola	.....	12–18	10–12	Yellow, with two violet marks in throat
halophilus Boiss., 1853	Asia Minor	.....	6–9	2–5	Rose
Hanningtoni Baker, 1892	Mountains of tropical Africa	.....	9–12	12–20	Dark purple
Harmsianus Vaupel, 1912	South Angola	.....	.....	Many	White, with bright red shadings
hastatus Thunb	Cape Colony	.....	12–24	2–4	Pink
heterolobus Vaupel, 1912	North Kamerun	.....	24–30	8–14	Bright rose
hirsutus Jacq	Cape Colony	.....	12	2	Yellow, dotted inside with red
humilis Stapf, 1885	Mesopotamia	.....	6–8	3	
hyalinus Jacq	Cape Colony	.....	12	2	Yellow, dotted inside with red
illyricus Koch	Europe	.....	12–18	3–6	Bright purple
imbricatus Linn	Europe, Asia	.....	12–18	4–10	Dark purple
inandensis Baker, 1892	Natal	.....	12–18	6–8	White, with a red keel outside
inflatus Thunb	South Africa	.....	12	1–4	Pink
involutus De la Roche	Cape Colony	.....	18	4–8	Bright pink, with purple blotches in throat
Johnstoni Baker, 1897	British Central Africa	.....	.....	.....	Bright red
Kirkii Baker, 1890	King William's Town	.....	36	.....	Pale pink, unspotted
Kotschyanus Boiss., 1853	Persia	1886	12–24	4–12	Dark violet-purple, darker purple line down center of lower segments
kubangensis Harms	Angola	.....	18	1–2	Spotted reddish brown

lambda Klatt, 1863	Cape Colony	.....	12	2	White, lower segments with two purple blotches at base
laxiflorus Baker, 1877	Angola	.....	12	4–6	Rose-purple
Leichtlinii Baker, 1889	Transvaal	.....	24	6–8	Bright red, lower segments red, at the tip yellow, with minute spots
linearifolius Vaupel, 1912	Katanga	.....	12–15	3–5	Deep lilac
Ludwigii Pappe, 1891	South Africa	.....	24–36	20–30	Pale yellow
luridus Welw., 1877	Angola	.....	12	10–12	Dull purple
luteolus Klatt	Portuguese East Africa.	.....	36	.....	Yellowish
luteus Lam	Madagascar	.....	12	Many	Yellow
Mackinderi Hook., 1902	Mount Kenis	.....	24	5–6	Scarlet
Macowani Baker, 1892	South Africa	.....	24–36	6–10	Bright scarlet
macrophlebius Baker, 1898	Angola	.....	24	.....	Deep red
malangensis Baker	Angola	.....	24–30	8–10	Violet
Masoniorum Wright, 1910	Tembuland	.....	12	9–10	Cream, with pale yellow throat
masukuensis Baker, 1897	British Central Africa	.....	12	.....	Lilac
Melleri Baker, 1876	Zambezi Highlands	.....	12–18	6–12	Bright red
micranthus Baker	Bechuanaland	.....	6–12	12–20	Bright purple
micranthus Stapf, 1885	Asia Minor	.....	6–8	3	Purple-violet
microphyllus Baker, 1892	East Griqualand	.....	6–8	.....	Pale red
Milleri Ker, 1803	Cape Colony	1757	12–18	4–5	Milk white
minus Vaupel, 1912	South Kamerun	.....	36–45	10–15	Upper segments rosy flesh, lower side segments blood red, lower middle segment rosy flesh with blood-red stripe
montanus Linn	Cape Colony	.....	24–36	Many	Pale red
multiflorus Baker, 1877	Angola	.....	12	.....	Bright purple
Münzneri Vaupel, 1912	Nyassaland	.....	18–20	4–6	Blue
niveni Baker, 1892	Cape Colony	1800	12	3–4	Bright lilac
nyikensis Baker, 1897	British Central Africa	.....	12	.....	Creamy white, veined red and tinged pink
Oatesii Rolfe	British Central Africa	.....	12–18	.....	White, tinged greenish brown
ochroleucus Baker, 1876	Tembuland	.....	30–36	8–12	Creamy yellow
oliganthus Baker, 1898	German East Africa	.....	9–12	.....	White
oligophlebius Baker, 1895	German East Africa	.....	12–18	Few	Pale pink
oppositiflorus Herb., 1842	.....	.....	36–48	30–40	White
orchidiflorus Andr	Cape Colony	.....	12–18	4–6	Greenish yellow
oreocharis Schltr., 1896	Cape Colony	.....	12	Few	
pallidus Baker, 1898	Angola	.....	24	.....	Pale pink
Pappei Baker, 1892	Table Mountain	.....	.....	2–3	Pink
parviflorus Baker	Cilician Taurus	1877	.....	.....	Pale, unstriped

GLADIOLUS SPECIES (*continued*)

Species	Habitat	Introduced	Height (inches)	Number of flowers on a stalk	Color of flowers
parvulus Schltr	Natal	.....	12–15	2–4	Rose
pauciflorus Baker, 1877	Mount Kilimanjaro	.....	24–36	5–6	White, lower segments not blotched at center
permeabilis De la Roche	Cape Colony	.....	12–24	6–12	Pale pink or lilac
persicus Boiss., 1853	Persia	.....	6–9	4–9	Pale purple
platyphyllus Baker, 1893	Natal	.....	18	.....	Deep yellow, with fine red lines
primulinus Baker, 1890	Tropical Africa	1890	18	4–5	Uniform primrose yellow
prismatosiphon Schltr., 1899	South Africa	.....	12–15	3–6	Pale rose, with purple dots
psittacinus Hook., 1830	South Africa	.....	36–48	Many	Upper segments dark crimson, lower segments red and yellow
psittacinus var. Cooperi Baker	.....	.....	36–48	Many	
puberulus Vaupel, 1912	Katanga	.....	15–18	7–10	Violet-red
pubescens Baker, 1876	Natal	.....	12–18	3–6	Pale pink
pulchellus Klatt, 1863	Cape Colony	.....	12	4–8	Pale red
punctatus Thunb	Paard Island	.....	24	6–10	Greenish yellow
purpureo-auratus Hook. f., 1872	Natal	1872	36	10–15	Primrose yellow, two inner segments with red-brown blotch at throat
Quartinianus A. Rich., 1851	Mountains of tropical Africa	1884	24–48	6–9	Bright yellow or bright red
quilimanensis Baker, 1898	Portuguese East Africa	.....	24–30	.....	Bright pink
rachidiflorus Klatt, 1882	Port Natal	.....	24	Many	Reddish
recurvus Linn	Cape Colony	.....	12–24	2–6	Yellowish white, much flushed with dark lilac. Very fragrant
Rehmanni Baker, 1892	Transvaal	.....	18–24	6–9	Bright red
Rogersii Baker, 1892	Cape Colony	.....	12	3	Bright red, without blotch in throat
rupicola Vaupel, 1912	West Usambara	.....	15–18	6	Red
salmoneus Baker, 1892	Cape Colony	.....	12	.....	Salmon red
Saundersii Hook. f., 1870	Cape Colony	.....	24–36	6–8	Bright scarlet, three lower segments with a great blotch of white, spotted with scarlet in throat
scaphochlamys Baker, 1892	Cape Colony	.....	18–24	6–8	Pinkish white
Scullyi Baker, 1892	Little Namaqualand	.....	12–18	3–4	Reddish

segetum Ker, 1804	Mediterranean region	.....	12–18	6–10	Bright purple, lower segments with a white central line
sericeo-villosus Hook., 1864	Orange Free State	1864	36–48	20–30	Bright ye'low
sintensii Baker, 1892	Armenia	.....	8	Few	Dark violet
spathaceus Pappe, 1892	Swartberg	.....	12–18	1	Pink
spathulatus Baker, 1892	Transvaal	.....	12	4–5	Dull red
spicatus Klatt, 1868	Guinea	.....	24	20	Bright purple
splendens Baker, 1876	Cape Colony	1870	24	4–6	Bright scarlet, three lower segments with a pale keel through lower half
splendidus Rendle	German East Africa	.....	36–48	7–8	Bright crimson
Staudtii Vaupel, 1912	Kamerun	.....	18–24	6	Shining red
stenophyllus Baker, 1897	Cape Colony	.....	.....	.....	Red
striatus Jacq	Cape Colony	.....	12	2–3	Yellowish and pale violet, streaked with red
strictus Jacq	Cape Colony	.....	12	2–3	Yellowish, with purple dots and stripes
subaphyllus Brown, 1909	Natal	.....	8–12	2–3	White, tinted pink
subulatus Baker, 1898	Angola	.....	6–12	Few	Bright pink
sulphureus De Graaf, 1850	Transvaal	1873	18	6–8	Pale golden yellow
tabularis Eckl., 1827	Table Mountain	.....	12	5–6	White, with a tinge of pink
Taubertianus Schltr., 1899	South Africa	.....	15–27	1–3	Pale violet
tenellus Jacq., 1787	Cape Colony	.....	12–18	2–5	Yellowish white, tinged lilac, lower segments much spotted in throat
tenuis Baker, 1876	Swellendam	.....	18–24	4–6	Pale pink
Thomsoni Baker, 1892	Mountains near Lake Nyassa	1880	.....	6–12	Pale red
trichonemifolius Ker. 1811	Cape Colony	.....	6–18	1–3	Yellow, three lower segments blotched purple in throat
tricolor Stapf, 1885	Asia Minor	.....	6–8	3	
triphyllus Sibth	Cyprus	.....	6–9	2–3	Upper segments purple, lower segments white with purple blotches
tristis Linn	Cape Colony	.....	12–24	3–4	Yellowish white, slightly flushed purple-black on keel. Fragrant
tristis var. concolor Salisb	Cape Colony	.....	12–24	3–4	White
tritonoides Baker, 1895	British Central Africa	.....	18–24	.....	Pink or pale lilac
Tysoni Baker, 1892	Cape Colony	.....	12	4–6	Bright red
uhehensis Harms, 1900	Uhehe	.....	24	10–15	White, shaded with lilac
undulatus Jacq	Cape Colony	.....	12	4–6	Milk white, with a red keel
unguiculatus Baker, 1876	Sierra Leone	.....	12–18	6–10	Purple
venulosus Baker, 1897	British Central Africa	.....	18	.....	White, veined claret-purple
Verdickii De Wild., 1901	Tukafu	.....	15–18	3–9	Pale yellow to yellow, with violet veins

GLADIOLUS SPECIES (*concluded*)

Species	Habitat	Introduced	Height (inches)	Number of flowers on a stalk	Color of flowers
villosus Ker, 1827	Cape Colony	.....	12–24	3–4	Bright red or lilac
vittatus Hornem., 1815	Cape Colony	.....	12	3–6	Pink, three lower segments with red or lilac central blotches
vomerculus Ker, 1827	Cape Colony	.....	12–18	2–3	Lilac, three lower segments blotched yellow in throat
Whytei Baker, 1897	British Central Africa	.....	6–12	.....	Dark purple, lower segments white with dark purple spots
Woodii Baker, 1892	Natal and Transvaal	.....	12–18	4–6	Dark red
zambesiacus Baker, 1892	Zambezi Highlands	.....	12–18	4–6	Pale purple
zanguebaricus Baker, 1898	Zanzibar	.....	12	5–6	Bright pink

The following described species are those concerned in the development of the cultivated gladiolus. The majority of them, if not all, are still offered in the catalogs of European dealers. Except as otherwise noted, the descriptions are from *Flora Capensis* (Baker, 1896–97).

G. alatus (Linn. Sp. Plant. edit. 2, 53); corm small, globose; tunics brown, membranous; basal leaves 3–4, linear, rigid in texture, the lowest the longest, ½–1 ft. long, ⅙–¼ in. broad, closely and strongly ribbed; stem ½–1 ft. long including the inflorescence; spike usually simple, few-flowered, very lax, with a very flexuose axis; spathe-valves broad, green, oblong-navicular, the outer 1–1¼ in. long; perianth pink; tube ½ in. long, funnel-shaped at the top; upper segment cucullate, obovate, cuneate, with a short claw, 1¼–1½ in. long, ½–¾ in. broad; side ones shorter, suborbicular, not unguiculate; 3 lower deflexed, with a small obovate blade and a long distinct claw; stamens reaching nearly to the tip of the upper segments; anthers lanceolate, ⅓ in. long. *Thunb. Diss. No.* 15, *ex parte*; *Andr. Bot. Rep. t.* 8; *Ker in Bot. Mag. t.* 586; *Gen. Irid.* 132; *Baker, Handb. Irid.* 223. *G. speciosus, Thunb. Fl. Cap.* i. 196. *G. papilionaceus, Lichten. in Roem. et Schult. Syst. Veg.* i. 408. *Hebea galeata, Eckl. Top. Verz.* 41.

VAR. β, **G. namaquensis** (Ker in Bot. Mag. t. 592); more robust, with lanceolate leaves sometimes 1½–2 in. broad, 9–10 flowers, and upper perianth-segments an inch broad. *Ker, Gen. Irid.* 132. *G. equitans, Thunb. Fl. Cap.* 192. *G. galeatus, Andr. Bot. Rep. t.* 122.

G. atroviolaceus Boiss. Diagn. xiii. 14. [Description from Baker, 1892.] *G. aleppicus* and *petræus* Boiss.— Corm ovoid, ½–¾ in. diam.; tunics of matted fibres, reticulated upwards. Leaves 3, firm, linear, closely ribbed, ½–1 ft. long, ⅛–¼ in. broad. Stem slender, 1–1½ ft. long. Flowers 4–8 in a lax secund spike; outer spathe-valve lanceolate, green, ¾–1 in. long. Perianth-tube curved, narrowly funnel-shaped, ⅓ in. long; limb dark purple, about an inch long; segments obovate, obtuse; upper ⅓ in. broad; lateral shorter; 3 lower as long as the upper, with a claw as long as the blade. Anthers as long as the filaments, mucronate. Capsule oblong, torulose, ½ in. long. Seeds globose, not winged.

G. blandus (Ait. Hort. Kew. i. 64); corm globose, middle-sized; tunics of parallel strands of matted fibres; produced subbasal leaves 4, ensiform, firm in texture, glabrous, the outer ½–1 ft. long, ½–¾ in. broad; stem 1–2 ft. long including inflorescence, sometimes branched; flowers white with a tinge of red, 4–8 in a lax distichous spike, all ascending; outer spathe-valves green, lanceolate, 1½–2 in. long; perianth-tube about 1½ in. long, much dilated and curved at the top; limb rather longer than the tube, segments oblong-spathulate, narrowed to a point, the top one about ¾ in. and the others about ½ in. broad at the middle; stamens reaching more than halfway up the limb. *Ker in Bot. Mag. t.* 625; *Gen. Irid.* 140; *Baker, Handb. Irid.* 217. *G. angustus, Linn. herb. ex parte!*

VAR. β, **G. albidus** (Jacq. Ic. t. 256); flower pure white. *G. blandus, Andr. Bot. Rep. t.* 99. *G. blandus, var. niveus, Ker in Bot. Mag. t.* 648.

VAR. γ, **G. Mortonius** (Herb. in Bot. Mag. t. 3680); flowers suberect; segments white, with copious, faint, vertical, pink streaks.

VAR. δ, **G. excelsus** (Sweet, Hort. Brit. edit. 2, 501); taller than the type, with longer leaves and a perianth-tube 2 in. long.

VAR. ε, **G. carneus** (Delaroche, Descr. 30, t. 4); more robust than the type, with more numerous, more spreading pink flowers, with broader, less acute segments. *G. campanulatus, Andr. Bot. Rep. t.* 188. *G. blandus, var., Ker in Bot. Mag. t.* 645.

Var. Hibbertii, Hort., has pink flowers with very distinct, red, spade-shaped marks on the three lower segments.

G. byzantinus (*Bankin*), Miller, Dict. ed. vii. No. 3; Ker in Bot. Mag. t. 874; Reich. Ic. Crit., t. 643. [Description from Baker, 1892.] *G. elatus* Balb.— Corm globose, ¾ in. diam.; tunics brown, membranous. Leaves generally 3, ensiform, about a foot long, ½–¾ in. broad, laxly ribbed. Stem 1½–2 ft. long. Spike lax, many-flowered, 6–9 in. long; outer spathe-valve lanceolate, 1–1½ in. long. Perianth-tube slightly curved, ⅓–½ in. long; segments dark purple, 1–1¼ in. long, about equal in length; 3 upper slightly imbricated in fully expanded flower, ½–¾ in. broad; 3 lower with a claw as long as the blade, and a white line down the centre. Anthers ½ in. long, exceeding the filaments. Capsule turbinate, ½ in. long. Seeds turgid, with a distinct membranous wing.

G. cardinalis (Curt. Bot. Mag. t. 135); corm large, globose; stem 3–4 ft. long; produced leaves 4–6, ensiform, rather thin in texture, glaucous green, reaching 2 ft. or more in length, ¾–1 in. broad; flowers 12–20 in a spike ½–1 ft. long, all more or less ascending; spathe-valves green, thin in texture, lanceolate, acute, 1½–3 in. long; perianth bright scarlet; tube nearly straight, 1½ in. long, funnel-shaped in the upper half; upper segments oblong-spathulate, acute, concolorous, 2 in. long, ¾–1 in. broad; 3 lower shorter and narrower, conspicuously mottled with white at the throat; stamens reaching more than halfway up the limb; anthers lanceolate, ⅓ the length of the filaments. *Schneev. Ic. t. 27*; *Red. Lil. t.* 112; *Ker, Gen. Irid.* 143; *Baker, Handb. Irid.* 219. *G. speciosus, Eckl. Top. Verz.* 41, *non Thunb.*

G. communis Linn. Sp. Plant. 52, ex parte; Curt. in Bot. Mag. t. 86; Ker in Bot. Mag. t. 1575; Red. Lil. t. 267; Reich. Ic. Crit. tab. 598; Fl. Germ. tab. 349, fig. 777. [Description from Baker, 1892.] — Corm ¾ in. diam.; tunics of matted parallel fibres, reticulated upwards. Leaves 3–4, ensiform, ½–1 ft. long, ½–¾ in. broad, laxly nerved. Spike lax, secund, 4–8-flowered; outer spathe-valve green, an inch long. Perianth-tube curved, funnel-shaped, ¼–⅓ in. long; segments bright purple, an inch long, about equal in length, all connivent when fully expanded; 3 lower with a long claw and white central line. Anthers ⅓ in. long, equalling the filaments. Capsule turbinate, ½ in. long. Seeds broadly winged.

G. cruentus (Moore in Gard. Chron. 1868, 1138); corm large, globose; stem 2–3 ft. long; produced leaves about 4, ensiform, dark glaucous green, 1½–2 ft. long, ¾–1 in. broad; spike rather dense, distichous, 6–10-flowered; bracts very large, lanceolate, the lower sometimes 3–6 in. long; perianth bright scarlet; tube 1½–2 in. long, nearly straight, funnel-shaped in the upper half; upper segments concolorous, obovate-spathulate, obscurely cuspidate, 2–2½ in. long, 1¼–1½ in. broad; 3 lower about 1½ in. long, 1 in. broad, with a large white blotch at the throat with small red spots; anthers lanceolate, reaching halfway up the limb. *Hook. fil. in Bot. Mag. t.* 5810; *Baker, Handb. Irid.* 219.

G. cuspidatus (Jacq. Ic. t. 257); corm globose; tunics of fine, parallel strands of matted fibres; stems simple, 2–3 ft. long; leaves 3–4, linear, rigid in texture, glabrous, the lowest 1½–2 ft. long, about ½ in. broad; flowers 4–8, in a lax secund spike; spathe-valves green, lanceolate, outer 2–3 in. long; perianth white or pale pink; tube slightly curved, 2–3 in. long, clavate in the upper third; segments oblong, 1½ in. long, ⅓–½ in. broad, narrowed into a long, wavy point, the three lower with a spade-shaped purple blotch; stamens reaching halfway up the limb. *Ker in Bot. Mag. t.* 582; *Gen. Irid.* 139; *Andr. Bot. Rep. t.* 219; *Red. Lil. t.* 136; *Baker, Handb. Irid.* 205. *G. undulatus, Linn. Mant.* 27; *Thundb. Fl. Cap.* i. 206, *ex parte. G. affinis, Pers. Syn.* i. 45.

VAR. *β*, **G. ventricosus** (Lam. Encyc. ii. 727); flowers pink; point of the segments shorter and less wavy. *G. cuspidatus, Andr. Bot. Rep. t.* 147; *Red. Lil. t.* 36. *G. carneus, Jacq. Ic. t.* 255; *Ker in Bot. Mag. t.* 591, *non Delaroche.*

VAR. *γ*, **ensifolius** (Baker); whole plant under a foot long; leaves short, rigid, ensiform.

G. dracocephalus (Hook. fil. in Bot. Mag. t. 5884); corm large, depresso-globose; stem simple, about 2 ft. long; produced leaves ensiform, 1–1½ ft. long, ¾–1 in. broad, moderately firm in texture; flowers few, arranged in a very lax secund spike; outer spathe-valve lanceolate, green, 2–3 in. long; perianth-tube much-curved, greenish, 1½–2 in. long; limb 1½ in. long, yellowish-green, minutely grained and spotted with dull purple; upper segments obovate, permanently hooded, ¾–1 in. broad; lower lanceolate, reflexing; stamens reaching near to the top of the segments; anthers lanceolate, less than half as long as the filaments. *Baker in Journ. Linn. Soc.* xvi. 176; *Handb. Irid.* 220.

G. floribundus (Jacq. Ic. t. 254); corm globose; tunics of matted fibres; produced leaves 3–4, ensiform, 1–2 ft. long; stems 1½–2 ft. or more long including the inflorescence, branched when at all luxuriant; flowers white with a pink tinge, 4–12 in a very lax distichous spike, all ascending; outer spathe-valve oblong-lanceolate, 1½–2 in. long; perianth-tube nearly straight, 1½–2 in. long, funnel-shaped in the upper third; segments as long as the tube, obovate-spathulate, deltoid at the tip, the upper ¾–1 in. broad; stamens reaching ⅓ or ½-way up the limb. *Ker in Bot. Mag. t.* 610; *Gen. Irid.* 143; *Baker, Handb. Irid.* 218. *G. grandiflorus, Andr. Bot. Rep., t.* 118.

G. grandis (Thunb. Fl. Cap. i. 186); corm globose; tunics of thick, parallel, wiry fibres; stem slender, terete, 1–2 ft. long; leaves 3, superposed, terete, strongly ribbed, firm in texture, the lowest 1–1½ ft. long; flowers fragrant, 2–6 in a very lax secund spike; spathe-valves green, lanceolate, the outer 2–2½ in. long; perianth 2½–3 in. long, with a curved tube funnel-shaped in the upper third; segments yellowish-white, more or less tinged with purplish-brown, especially on the keel, oblong, ½–¾ in. broad, narrowed into a long point; stamens reaching halfway up the limb; capsule oblong, membranous, 1½ in. long. *Klatt in Linnæa* xxxii. 714; *Baker, Handb. Irid.* 202. *G. tristis, Linn. herb.! G. tristis, var. grandis, Thunb. Diss. No.* 8. *G. versicolor, Andr. Bot. Rep. t.* 19; *Ker in Bot. Mag. t.* 1042; *Gen. Irid.* 135.

G. hirsutus Jacq. Ic. t. 250; Red. Lil. t. 278. [Description from Baker, 1892.] *G. roseus* Andr. Bot. Rep. t. 11. *G. hirsutus* var. *roseus* Ker in Bot. Mag. t. 574. — Corm middle-sized, globose, crowned with a ring of bristles. Leaves 4–5, superposed, ensiform, strongly ribbed, both the sheath and short blade finely hairy. Stem 1–1½ ft. long. Flowers 3–6 in a very lax secund spike; spathe-valves lanceolate, green, lower outer 1½–2 in. long. Perianth bright red, with a curved tube 1½ in. long; segments obovate, cuspidate, as long as the tube, the upper ¾ in., the lower ½ in. broad. Stamens more than half as long as the segments.

G. oppositiflorus (Herb. in Bot. Reg. 1842, Misc. 86); corm large, globose; tunics of matted fibres; produced basal leaves about 4, ensiform, firm in texture, 1–1½ ft. long, ¾–1 in. broad; stem 3–4 ft. long including the inflorescence, often branched; flowers up to 30 or 40, arranged in a distichous spike often a foot

FIG. 6. GLADIOLUS PAPILIO

long; spathe-valves green, lanceolate, acute, thin in texture, 1–1½ in. long; perianth white; tube curved, 1–1¼ in. long, slender up to the top; limb horizontal, 1½ in. long, with oblong-spathulate acute segments not more than ⅓–½ in. broad at the middle; stamens half as long as the limb. *Baker, Handb. Irid.* 218; *Bot. Mag. t.* 7292.

G. Papilio (Hook. fil. in Bot. Mag. t. 5565); corm middle-sized, globose; tunics of parallel strands of fine matted fibres; produced subbasal leaves about 4, ensiform, glabrous, rigid in texture, 1–1½ ft. long, ¾–1 in. broad at the middle; stem 2–3 ft. long including the inflorescence; flowers pale purple, 6–12 in a lax spike; spathe-valves oblong-navicular, cuspidate, the outer 1–1½ in. long; perianth horizontal; tube curved, ¼ in. long, broadly funnel-shaped in the upper half; limb 1¼–1½ in. long; 3 upper segments obovate-spathulate, ½–¾ in. broad, upper not reflexing; 3 lower oblong-unguiculate, with a large reddish spade-shaped blotch edged with yellow at the throat; stamens reaching halfway up the limb. *Baker in Journ. Linn. Soc.* xvi. 175; *Handb. Irid.* 216.

G. primulinus Baker in Gard. Chron. 1890, ii. 122. [Description from Baker, 1892.] — Corm large, globose. Basal leaves 3, ensiform, subcoriaceous, strongly ribbed, the lowest a foot long, ¾ in. broad. Stem 1½ ft. long, the upper short and adpressed. Spike lax, secund, 4–5-flowered; spathe-valves lanceolate, green, 1–1½ in. long. Perianth uniform primrose-yellow; tube much curved, an inch long; upper segments obtuse, much imbricated, 1¼ in. long; 3 lower smaller. Stamens reaching halfway up the segments.

G. psittacinus (Hook. in Bot. Mag. t. 3032); corm very large, depresso-globose; tunics of parallel strands of matted fibres; produced leaves about 4, ensiform, rigid in texture, 1–2 ft. long, 1–2 in. broad; stem 3–4 ft. long including the inflorescence; spike very lax, reaching a foot or more in length; spathe-valves green, oblong-lanceolate, 2–3 in. long; perianth-tube curved, 1½–2 in. long, sub-cylindrical in the upper half; limb about equalling the tube; upper segments obovate, dark crimson, hooded, ¾–1 in. broad; lower segments much smaller, reflexing at the top, red and yellow mixed; stamens reaching nearly to the tip of the segments; anthers ½ in. long; filaments about 1½ in. long; capsule large, oblong. *Bot. Reg. t.* 1442; *Reich. Exot. t.* 116; *Baker, Handb. Irid.* 220. *G. natalensis, Reinw. ex Hook. in Bot. Mag. sub t.* 3084; *Sweet, Brit. Flow. Gard. ser.* 2, *t.* 281; *Lodd. Bot. Cab. t.* 1756. *Watsonia natalensis, Eckl. Top. Verz.* 34.
VAR. *β*, **G. Cooperi** (Baker in Bot. Mag. t. 6202); perianth-tube 2½–3 in. long; segments more acute.

G. purpureo-auratus (Hook. fil. in Bot. Mag. t. 5944); corm large, globose; tunics of parallel strands of matted fibres; leaves ensiform, glabrous, rigid in texture, much shorter than the stem; stem 3 ft. long including the inflorescence; flowers 10–15 in a lax secund spike a foot long; spathe-valves green, oblong-lanceolate, 1–1½ in. long; perianth primrose-yellow; tube much curved, funnel-shaped, under an inch long; upper segments plain, obovate-spathulate, 1¼–1½ in. long, ¾ in. broad; lower obovate-unguiculate, the two inner with a spade-shaped red-brown blotch at the throat; stamens reaching halfway up the limb. *Baker in Journ. Linn. Soc.* xvi. 175; *Handb. Irid.* 216.

G. recurvus (Linn. Mant. 28); corm globose, ¾–1 in. diam.; tunics of parallel wiry fibres; stems slender, simple, 1–2 ft. long; leaves 3, firm in texture, terete, strongly ribbed, the lowest about a foot long; flowers very fragrant, 2–6, in a very lax secund spike; outer spathe-valve green, lanceolate, 1½–2 in. long; perianth-tube curved, 1½–2 in. long, clavate in the upper third; limb 1–1¼ in. long, yellowish-white, much flushed with dark lilac; segments oblong, acute, ½ in. broad; stamens reaching more than halfway up the limb; capsule oblong, membranous, 1–1¼ in. long. *Ker in Bot. Mag. t.* 578, *non Thunb.*; *Baker, Handb. Irid.* 203. *G. punctatus, Jacq. Ic. t.* 247. *G. tristis*, var. *punctatus, Thunb. Diss. No.* 8. *G. carinatus, Ait. Hort. Kew.* i. 64. *G. ringens, Andr. Bot. Rep. tt.* 27 *and* 227; *Red. Lil. t.* 123. *G. odorus, Salisb. Prodr.* 40. *G. violaceus, Pers. Syn.* i. 43. *Watsonia recurva, Pers. Syn.* i. 43. *G. breynianus, Ker, Gen. Irid.* 135. *G. maculatus, Sweet, Hort. Brit. edit.* 1, 397; *Klatt in Linnæa* xxxii. 708.

G. Saundersii (Hook. fil. in Bot. Mag. t. 5873); corm large, depresso-globose; produced leaves 4–6, ensiform, rigid in texture, strongly ribbed, 1–2 ft. long, ¾–1 in. broad; stem 2–3 ft. long including inflorescence; spike very lax, ½ ft. long, 6–8-flowered; spathe-valves green, lanceolate, 1½–2 in. long; perianth-tube curved, 1–1½ in. long, broadly funnel-shaped in the upper half; limb bright scarlet; 3 upper segments concolorous, oblong-spathulate, acute, an inch broad; 3 lower shorter, ½ in. broad, with a great

blotch of white spotted with scarlet at the throat; stamens reaching nearly to the tip of the segments; anthers ½ in. long, half the length of the filaments. (*Baker in Journ. Linn. Soc.* xvi. 176; *Handb. Irid.* 220.)

G. segetum Ker in Bot. Mag. t. 719; Reich. Ic. Crit. t. 600; Fl. Germ. tab. 353, fig. 781. [Description from Baker, 1892.] *G. communis* Linn. ex parte; Sibth. & Sm. Fl. Græc. t. 37. *G. infestus* Bianea. *G. italicus* Gaud. *G. inarimensis* Guss. *G. Ludoviciæ* Jan. *G. caucasicus* Herb. *Sphærospora imbricata* Sweet.— Corm globose, ¾–1 in. diam.; tunics of matted parallel fibres, reticulated upwards. Produced leaves 3–4, ensiform, 1–1½ ft. long, ½–¾ in. broad, laxly unequally nerved. Stem 1–1½ ft. long. Spike lax, 6–10-flowered; outer spathe-valve green, lanceolate, 1–1½ in. long. Perianth-tube curved; ¼–⅓ in. long; segments 1–1½ in. long, bright purple, obovate, obtuse; the upper ½ in. broad, with a short claw; the lateral shorter; the 3 lower as long, with a long narrow claw and white line down the keel. Anthers ½ in. long, exceeding the filaments. Capsule turbinate, ½ in. long, torulose when mature. Seeds brown, globose.

G. sericeo-villosus (Hook. in Bot. Mag. t. 5427); corm large, globose; leaves about 6 in a subbasal distichous rosette, ensiform, glabrous, strongly ribbed, 1½–2 ft. long, ½–1 in. broad; stem 3–4 ft. long including the inflorescence, clothed throughout with soft, crisped, white, spreading hairs; spike distichous, 20–30-flowered, with a flexuose, densely villose axis; outer spathe-valve oblong-lanceolate, villose, scariose in the upper half; flower bright yellow; perianth-tube curved, funnel-shaped, ½–¾ in. long; limb rather longer than the tube; upper segments oblong-spathulate, ¼ in. broad; lower narrower, unguiculate; stamens reaching halfway up the limb. *Baker, Handb. Irid.* 215.

G. tristis (Linn. Sp. Plant. edit. 2, i. 53, ex parte); corm globose, 1 in. diam.; tunics of fine parallel strands of matted fibres; stems slender, simple, 1–2 ft. long; leaves 3, superposed, terete, with 3–5 much-raised, stramineous ribs, the lower 1–1½ ft. long; flowers 3–4 in a very lax secund spike, fragrant; spathe-valves green, lanceolate, 1½–2 in. long; perianth-tube curved, 1½–2 in. long, funnel-shaped in the upper third; limb yellowish-white, slightly flushed on the keel of the segments with purplish-black; segments oblong-spathulate, acute, ⅓–½ in. broad; stamens more than half as long as the perianth-limb; capsule oblong, membranous, an inch long. *Thunb. Diss. No.* 8, *ex parte*; *Curt. in Bot. Mag. t.* 272; *Jacq. Ic. t.* 243; *Ker in Bot. Mag. t.* 1098; *Gen. Irid.* 136; *Baker, Handb. Irid.* 203. *G. spiralis, Pers. Syn.* i. 43; *Red. Lil. t.* 35.

VAR. β, **G. concolor** (Salisb. Parad. t. 8); flowers almost concolorous, and a purer white than in the type. *G. tristis, Jacq. Ic. t.* 245.

EVOLUTION OF THE GLADIOLUS

There are fifteen species of Gladiolus in Europe, Asia Minor, and Persia. These are, according to Baker: *atroviolaceus* Boiss.; *byzantinus* Miller; *communis* Linn.; *halophilus* Boiss.; *humilis* Stapf; *illyricus* Koch; *imbricatus* Linn.; *Kotschyanus* Boiss.; *micranthus* Stapf; *palustris* Gaud.; *persicus* Boiss.; *segetum* Ker; *sintensii* Baker; *tricolor* Stapf; *triphyllus* Sibth. Only a few of these have been cultivated; *G. communis* and *G. segetum*, however, have been cultivated for several centuries. It is not improbable that the Greeks and the Romans used the flowers of native species, gathered from their grain-fields,[6] in their floral decorations. The plant may even have been cultivated by these peoples.[7] However this may be, there is no definite record of the time when the plant came into cultivation. The two species just named either grew in Britain or were taken there in early times, and, according to Gerarde (1597), were important garden plants. *G. byzantinus*, the Constantinople corn flag, was introduced prior to 1629.

[6] Dioscorides says that a purple-flowered gladiolus (probably *G. communis*) grew mostly in cultivated grounds.

[7] Atheneus says gladiolus was planted on the graves of virgins.

An idea of the garden gladioli of three centuries ago may be obtained from *Hortus Eystettensis* (Besler, 1613), in which six colored figures of gladiolus appear. These are as follows:

FIG. 7. GARDEN GLADIOLI THREE CENTURIES AGO

Folio 10 II. *Gladiolus sylvestris* Cordi (*Victorialis rotunda*).
Runde Sigwurz mit rother blumen.
A small slender plant bearing three flowers on the spike.
III. *Gladiolus Narbonensium flore purpureo.*
Schwertelbrauner.
A spike bearing nine flowers is shown.

IV. *Gladiolus Narbonensis flore incarnato.*
Leibsarb Schwertel.
A spike bearing six flowers is shown.

Folio 12 V. *Gladiolus Italicus flore rubro.*
Roth Welsch Schwertlilien.
A five-flowered spike is shown.

FROM HORTUS EYSTETTENSIS, 1613

Gladiolus Hispanicus flore albo | Gladiolus Italicus flore rubro | Gladiolus Narbonensis flore incarnato, intensiore, seu magis roseo

FIG. 8. GARDEN GLADIOLI THREE CENTURIES AGO

II. *Gladiolus Hispanicus flore albo.*
Weiss Spanisch Schwertlilien.
A seven-flowered spike is shown.

III. *Gladiolus Narbonensis flore incarnato, intensiore, seu magis roseo.*
Leibsarb Narbonische Schwertlilien.

The flowers shown in folio 10 appear to belong to different species. Ker identifies Figure 11 with *G. imbricatus* Linn. and Figures 111 and 1v with *G. communis* Linn. The plants shown in Figures 11 and 111 of folio 12 are probably of the same species, possibly *G. segetum*, while Figure 1 belongs to a secund-flowered species.

Ray (1686–1704) writes of the corn flag as of no great esteem, and only consents to admit the plant to the flower garden because the flowers bloom at a season — in June and July — when there are not many other flowers. He mentions *Gladiolus byzantinus*, *G. flore suave rubente*, and *G. flore alba*, and names three other commoner varieties — two French corn flags, one with ash-colored and the other with red flowers, and the Italian corn flag "that beareth saddei red flowers on both sides of the stalks." He says further that *G. byzantinus* is somewhat tender and should be protected, but the others are hardier.

Miller (1731) describes the following species:

1. *Gladiolus utrinque floridus.* C. B. P.[8] Cornflag with Flowers on both Sides the Stalks.
2. *Gladiolus carnei coloris.* Swert. Flor.[9] Flesh-colour'd Cornflag.
3. *Gladiolus floribus uno versu dispositis, major, floris colore purpureo-rubente.* C. B. P. Great Cornflag, with reddish-purple Flowers rang'd on one Side the Stalk.
4. *Gladiolus major Byzantinus.* C. B. P. Great Cornflag of Constantinople.
5. *Gladiolus utrinque floridus, floribus albis.* H. R. Mons.[10] Cornflag with white Flowers rang'd on each side the Stalk.
6. *Gladiolus maximus Indicus.* C. B. P. The largest Indian Cornflag.

In a later edition (1754) he adds the following:

7. *Gladiolus floribus uno versu dispositis, major and procerior, flore candicante.* C. B. P. Greater and taller Cornflag, with whitish Flowers rang'd all on one Side.
8. *Gladiolus floribus uno versu dispositis*, minor and humilior. C. B. P. Smaller and lower Cornflag, with Flowers ranged on one Side.
9. *Gladiolus minor, floribus uno versu dispositis incarnatis.* H. L. Smaller Cornflag, with flesh-coloured Flowers ranged on one Side.
10. *Gladiolus utrinque floridus, flore rubro.* C. B. P. Cornflag with red Flowers on both Sides.
11. *Gladiolus floribus uno versu dispositis, minor.* C. B. P. Smaller Cornflag, with Flowers ranged on one Side.

It is probable that among the latter species nos. 7, 8, 9, and 11 are varieties of no. 3, and that nos. 5 and 10 are varieties of no. 1. Miller says that all these sorts of corn flag are

propagated by their tuberose Roots, which the first, second, and fifth Sorts produce in great Plenty; so that in a few Years, if they are suffer'd to remain unremov'd, they will spread very far, and are hardly to be intirely rooted out, when they have once gotten Possession of the Ground. . . . . These roots may be taken up in July, when their Leaves decay, and may be kept out of the Ground until October. . . . . .

[8] C. B. P.= Casper Bauhin's *Pinax*.
[9] Swert. Flor.= Swertius' *Florilegium*.
[10] H. R. Mons.= Catalogue of Royal Garden at Montpelier.

The third and fourth Sorts are the most valuable, producing taller Stalks, and fairer Flowers: nor are these so apt to increase; which renders them fitter for the Borders of a Flower-garden; so that since these have been introduced, and become common, the other Sorts have been rejected, unless in some old Gardens, or for large Wilderness-quarters, where they will grow better than the two last-mentioned.

. . . . . .

The Indian Cornflag is tender, and must be preserved in a warm Green-house, or a moderate Stove, during the Winter-season. These Roots should be planted in pots filled with a light sandy soil. The best time to transplant them is any time from May.....till September.

A study of these species — *G. communis*, *G. segetum*, and *G. byzantinus* — leads to the conviction that the greatest possible advance had been made as early as the time of Parkinson. No further improvement in garden gladioli was made for about one hundred and fifty years, when other species were introduced.

It is not definitely known which of the African species from the Cape of Good Hope was first introduced into Europe. The evidence points to *G. angustus* and *G. tristis*, since they are mentioned by Breyne (1739 b) and the former was figured by Linnæus in *Hortus Cliffortianus* (1737). *G. tristis* was flowered by Miller in 1745, and *G. alatus* and *G. recurvus* (the latter under the name *Breynianus*) were also, according to Ker, known to Breyne. These were followed by *G. Milleri*, 1751, *G. involutus*, 1757, and *G. undulatus*, 1760.

Soon a great many irids from the Cape were described under the genus Gladiolus, but later a large proportion, if not the majority, of these were transferred to new genera. This, together with the confusion concerning the identity of the species, makes it quite impossible to fix with certainty the date of introduction of these older forms. For example, Lamarck's Encyclopedia (1786) describes thirty-two species, of which only eight — *alatus* Linn., *angustus* Linn., *communis* Linn., *imbricatus* Linn., *luteus* Lam., *montanus* Linn., *recurvus* Linn., and *tristis* Linn.— are now recognized as true species of Gladiolus, most of the others being now included in Babiana and Watsonia.

G. blandus was introduced in 1774, *G. cardinalis* and *G. floribundus* in 1789. These species gave the first impetus to gladiolus improvement.

The attention of amateurs and gardeners appears to have been directed toward the early-flowering species, which yield flowers during the early summer when planted in the fall. This was possible because many of the species were fairly hardy in England and the Low Countries. Such species as *cardinalis*, *communis*, *blandus*, and *tristis* were especially adapted for garden planting. The plants seeded freely, and since cross-fertilization is easily accomplished in gladioli it is not surprising to find a number of new forms soon appearing in the gardens.

The first important hybrid appears to have been *G. Colvillei*, or Colville's corn flag, which was raised in 1823 at Colville's Nursery, Chelsea, England,

from seeds of *G. concolor* fertilized by the pollen of *G. cardinalis*. *G. concolor* is now regarded by botanists as a variety of *G. tristis*. The flowers were bright scarlet, with lanceolate blotches of white on the three lower segments. The flowers were fragrant, which points to *G. tristis* as one of the parents. This hybrid is still in the market and is, at least in America, the most important variety for growing under glass.

Although the production of *G. Colvillei* was the first important achievement in the improvement of gladioli, it was not the result of the first efforts in this field. The earliest attempts to hybridize gladioli appear to have been made by the Honorable William Herbert, Dean of Manchester, early in the last century. In 1818 he wrote the Horticultural Society of London as follows (Herbert, 1820:196):

> Having raised two beautiful and hardy species of Gladiolus, by impregnating Cardinalis with Blandus and Blandus with Cardinalis, ... I propose to call one Gladiolus Blando-Cardinalis, and the other Gladiolus Cardinali-Blandus. These two new species of Gladiolus which have flowered make seed freely. I have also mules from Gladiolus tristis impregnated by the large flowering blue Gladiolus recurvus. . . . . .

Later, in 1819, in his classic paper *On the Production of Hybrid Vegetables* (Herbert, 1822a:44–45), he wrote:

> Of Gladioli I possess the following mules: G. blando-cardinalis, G. cardinali-blandus, G. angusto-blandus, G. tristi-blandus, G. floribundo-blandus; G. cardinali-angusto-blandus; G. tristi-hirsutus; G. ringenti-tristis, and G. versicolore-hirsutus. I have this year seeds from further intermixtures, and mules may probably be obtained with endless variety of colour. These mules flower most beautifully in the open border, in a mixture of sand and peat, in patches amongst the Azaleas. It is perhaps best to take up the bulbs, and dry them, when the seed is ripe; but I have left African Gladioli unmoved for several years, in the border. I have never seen the least approximation to each other in the natural seedlings of G. blandus, G. tristis, G. cardinalis, G. hirsutus, and G. recurvus.

Dean Herbert was an enthusiastic cultivator of gladioli, as well as an authority on the Cape bulbs. The following prophecy, written in 1820 (Herbert, 1822b), will be of interest to all lovers of gladioli:

> I am persuaded that the African Gladioli will become great favorites with florists, when their beauty in the open border, the facility of their culture, and the endless variety which may be produced from seed by blending the several species, are fully known, nor will they be found to yield in beauty to the Tulip and Ranunculus.

In 1837 he wrote as follows:

> The hybrid Gladioli, of which a large portion are sufficiently hardy, flower about the same time as the roses. . . . . These hardy crosses are between G. Cardinalis, blandus, carneus, inflatus, angustus, and tristis, and they vary with every shade of colour from white to scarlet, rose, coppery, and blackish purple, and some are exquisitely speckled in consequence of the cross with tristis. . . . . The beautiful crosses with hirsutus, recurvus, and versicolor are more delicate plants, and do not succeed well in the border.

Ten years later, in the Journal of the Horticultural Society of London, he wrote (Herbert, 1847):

> Forty years ago I first crossed the large and brilliant scarlet and white Gladiolus cardinalis with the smaller, but more freely flowering, G. blandus, which sports with

white, purple, and rose coloured flowers, and (under the name of carneus, which was in truth rather a local variety of the same) of a coppery flesh-colour. The result was a fertile breed of great beauty, of which the prevailing colour was purplish roseate. Crossed again with cardinalis it yielded florid plants, scarlet, copper-coloured, rose-coloured, white, and purple with endless variation. By a cross of the first mule and of cardinalis itself with G. tristis, of which the flower is pale yellow with brown specks, deeper tints and rich speckling were introduced, with a difference in the foliage and seeds, the seed of G. tristis being smaller and longer, its leaves rigid and quadrangular, the transverse section exhibiting a cross. The seeds of cardinalis are like those of blandus, but larger. There can scarcely be two species more dissimilar than cardinalis and tristis in any genus which has the form of the perianth uniform, the latter having such remarkable leaves, narrow, rigid, and erect, a slender stem, with night-smelling flowers, and the former very broad semi-recumbent glaucous foliage, and an inclined half-recumbent stem with large scarlet and white blossom; yet the produce of these intermixed is fertile, and where the third species blandus has been also admitted into the union, it is fertile in the extreme (incomparably more so than the pure G. cardinalis), and by that triple cross the tall strong Gladiolus oppositiflorus of Madagascar has also produced offspring, which, though not disposed at present to make seed freely, has produced some this year. Again, the first of these mules was fertilized by G. hirsutus (known at the Cape by the name roseus), a plant with flowers straighter than usual in the genus, and strongly scented, the leaves hairy and margined with red. That cross has not as yet proved fertile. The same G. hirsutus was crossed by Mr. Bidwell at Sydney, where the Cape bulbs thrive more freely than here, with G. alatus (which Ecklon wished to turn off into a genus Hebea), having hard rigidly ribbed leaves, a short stem, and orange flowers. The cross-bred plants flowered here last autumn, being intermediate in foliage and flower. The only opportunity I have had of crossing G. alatus with the first-named mules was defeated, notwithstanding much precaution, through the introduction of pollen by the humblebees, which are dangerous marplots to such experiments.

The second important hybrid was *G. ramosus*, which, according to the *Revue Horticole* for 1838, was obtained at Haarlem from seed of *G. blandus*, or "*floribunda*." It was first flowered in France by M. Rifkogel in 1838. Meanwhile (in 1835) it had been introduced into England and a figure of it was published in *Paxton's Magazine of Botany* (volume 6 [1839], pages 99 and 100). The flower was openly funnel-shaped, bright red with deep blotches at the base of the three lower segments, and resembled *G. blandus*. The plant was tall, with heavy, broad leaves. Although it was not entirely hardy, requiring a heavy mulch for protection, it was necessary to plant it in the fall in order to get results. Nevertheless the varieties of this type, owing to the fact that they flowered later than those of *G. blandus* and *G. cardinalis*, formed an important group for at least the next twenty years and have not yet entirely disappeared from European lists.

A number of hybrids were obtained by crossing *G. floribundus* and *G. ramosus*. Some of these, figured by color plates in works of the time, were Triomphe de Louvain (Carolus, 1845), Countess Coghen and Madame de Vilain (Rosseels, 1847), Leopoldii (Carolus, 1848), and Mademoiselle Sosthenie (Truffaut fils, 1848).

Up to 1840, in spite of the efforts to improve the gladiolus and notwithstanding the amount of variation that had resulted from these efforts, the plant remained little more than a plant for the attention of interested

amateurs. Before that time it does not appear to have received general attention or to have been an important plant in the seed or nursery trade.

In the following table the names of varieties of gladioli are given, with their prices, as taken from advertisements of Messrs. T. & C. Lockhart, 156 Cheapside, London. The table shows the varieties cultivated in England prior to the introduction of *G. gandavensis*.

Species or variety	Year					
	1837	1838	1839	1840	1841	1842
	Per dozen	Per dozen	Per dozen	Per dozen	Per dozen	Each
	s. d.	s. d.	s. d.		s. d.	s. d.
albus	4–0	4–0	4–0	.....	1–0	.....
byzantinus	2–0	3–0	3–0	.....	2–6	0–2
cardinalis inflatus	5–0	6–0	5–0	.....	6–0	0–6
psittacinus	3–0	.....	2–6	.....	2–0	0–3
	Each	Each	Each	Each	Each	Each
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Colvillei	.....	.....	.....	2–0	2–0	1–0
floribundus	1–4	1–0	.....	.....	0–6	1–0
salicatus	.....	1–0	2–6	2–0	2–6	1–6
Herbertii	.....	.....	.....	2–0	3–6	2–0
hirsutus	.....	2–6	2–6	.....	2–6	.....
inflatus blandus	.....	.....	.....	.....	.....	1–6
insignis	.....	.....	.....	15–0	15–0	10–0
Loddigesii	.....	.....	.....	5–0	5–0	3–6
praecox	.....	1–0	2–6	.....	2–6	1–0
roseus	.....	1–0	2–6	.....	2–6	1–6
tristis	.....	1–0	1–6	.....	1–6	1–0
trimaculatus	.....	1–0	2–6	2–0	2–6	1–0
ramosus	.....	20–0	15–0	12–6	5–0	5–0

At this time came the real starting point of the modern garden gladiolus, in *G. gandavensis*, sent out by Louis van Houtte in 1841. This gladiolus originated with M. Beddinghaus, gardener to the Duc d'Aremberg, who decided to produce hybrids between *G. psittacinus*, *G. floribundus*, *G. ramosus*, and *G. cardinalis*, all of them tall, showy species. He obtained seed in 1837, and in 1839 and 1840 he exhibited his seedlings in flower at Enghien. A seedling, a hybrid between *G. psittacinus* (*G. natalensis* Reinw.) and *G. cardinalis*, was admired by those who saw it. M. Van Houtte purchased it and introduced it through the medium of his catalog. Later he published a color plate of it in his *Flore des Serres*, with the following description by Lemaire (1846b): "Le *Gladiolus gandavensis* a le port et l'inflorescence du *G. natalensis*, mais dans des proportions plus grandes, le coloris du *G. cardinalis*, mais plus riche et plus varié."

This hybrid created a furor in the gladiolus world, and the interest in the plant steadily grew after this form was introduced. It was soon followed by *G. gandavensis* var. *citrinus*, a citron yellow flower having a red stripe down the middle of each of the three lower segments.

Dean Herbert, who at this time had had long experience in hybridizing gladioli, doubted the parentage of G. *gandavensis* as given by M. Van Houtte. He said (1837:365): "I have not succeeded in obtaining any cross, on the correctness of which I can depend, by admixture with Gladiolus psittacinus (Nathalensis), and I do not believe that it will breed with any of the above" (referring to *G. cardinalis*, *blandus*, *carneus*, *inflatus*, *angustus*, *tristis*, *hirsutus*, *recurvus*, and *versicolor*).

It appears that in the discussions of the time *G. floribundus* was confused, at least in commercial circles, with *G. oppositiflorus* — a not unnatural result when it is considered that the true plants are closely allied botanically. Both are allied to *G. blandus*. The flowers of the two first named are white or only tinged with pink; and considering the number of flowers produced on a spike, it is reasonable to suppose that these species would be used in crossing. In fact there is evidence of *G. floribundus* having been used. Among the first of its hybrids were those of Mr. Cole, gardener for Mr. Willmore at Oldford, England, who sent out the following varieties in 1850:

Willmoreanus, a hybrid between *G. gandavensis* and *G. floribundus*, creamy white, the three upper divisions streaked delicate rosy purple.

Oldfordiensis, delicate salmon color marked with purple. Flowers large.

Roseo-purpureus, deep rosy red, marked with deep purple-red. Flowers of medium size. Two years later Wellington, a deep orange-red variety, was sent out from the same source.

The record is not clear as to *G. oppositiflorus* unless the plant used by Mr. Cole was really this species. However one may regard the statements concerning the origin of *G. gandavensis*, there is no escaping the conclusion, after studying present-day varieties of this group, that *G. oppositiflorus* either was one of the parents of the original hybrid or has been used in hybridizing with it. Without herbarium specimens of the first varieties of *gandavensis*, it is of course difficult to determine whether they exhibit any characteristics of *G. oppositiflorus*. On examination of the colored figures of this form, it would seem as though the distichous arrangement of the flowers on the spike was apparent from the beginning. Paxton (1844) figures *G. gandavensis* and gives a botanical description wherein he states that it is distichously spicate. Although this is placed in that part of the description referring to the genus, the author must have known that most of the species of Gladiolus have secund spikes,

among them being *G. cardinalis* and *G. psittacinus*, the reputed parents of *G. gandavensis*. The evidence is strongly in favor of the idea that *G. gandavensis* is a hybrid between *G. psittacinus* and *G. oppositiflorus*.

About this time appeared *G. brenchleyensis*, raised by Mr. Hooker, of Brenchley. The earliest record (1848) of this gladiolus states that it is a hybrid between *G. psittacinus* and *G. floribundus*, but since then it has usually been considered as a form of *G. gandavensis*. Whatever its origin, it ranks next to *G. Colvillei* in being the oldest of existing types of gladioli.[11]

Prior to 1850 — except for the work of Dean Herbert, whose breeding of gladioli was perhaps more scientific than practical — there had been no sustained effort in the improvement of the gladiolus. Every flower that has won an important place has had one or more great geniuses to develop it and thus make it known to plant lovers. M. Eugène Souchet, gardener for Napoleon III at Fontainebleau, was the greatest of the many breeders of gladioli. He began his labors about 1850 and continued them until shortly before his death in 1880. It is quite probable that he used *G. floribundus* and *G. ramosus* in crossing the varieties of *G. gandavensis*, but such was his ability as a breeder that his varieties took foremost rank at once and maintained the lead throughout his life. The work was then carried on by his nephews, Messrs. Souillard and Brunelet.

It must not be inferred that Eugène Souchet had a clear field as a gladiolus breeder, even in France, for others were at work. M. Courant, of Poissy, raised and introduced such varieties as Docteur Marjolin, Madame Thibaut, Keteleer, M. Loyre, in 1855, and Claire Courant, Keteleeri, Miniatus, in 1858. M. Truffaut fils, who worked much with forms of *G. ramosus*, produced in that section the following varieties: Mademoiselle Sosthenie, a famous hybrid between *G. ramosus* and *G. floribundus*, in 1848; Bernard de Rennes and Madame Bertin, in 1850; Madame Vilmorin and Imperatrice Eugénie, in 1855; Comtesse de Saint Marsault, Arc-en-ciel, Madame Hardy, President Decaisne, in 1858; and Comte de Paris, Marguerite Regaud, Napoleon III, in 1860. Among the *G. psittacinus* x *gandavensis* hybrids produced by M. Truffaut were Madame Souchet, Madame Truffaut, and Charles Rouillard, sent out in 1855. M. Domage, of Montrouge, offered Premices de Montrouge, in 1858, Eugène Domage, Mademoiselle Marsault, Solferino, in 1860, Solfaterre, in 1861, and Madame Domage, in 1862. A. Malet, of Plessis-Picquet, introduced Antiope, Madame Marc Caillard, Madame Place, Madame Vilmorin, in 1858, and Anacreon Cardinal, M. Morel, Gustave Malet, in 1861. M. Duval, of Petit Bicêtre, placed before the public Madame Duval, M. Leroy, and Ernest Duval, in 1862. Eugène

[11] *G. ramosus* is regarded as a group of which the original form is probably lost.

Verdier, of Paris, sent out Eugénie Verdier, Madame Eugène Verdier, Olympe Lescuyer, and Victor Verdier, in 1858.

A few years after M. Souchet began the improvement of gladioli, an event occurred which had far-reaching results — if not politically, at least in the history of the gladiolus. This was the visit of Queen Victoria to Fontainebleau in August, 1855. During her visit the flower borders were enlivened with cut spikes of gladioli thrust in vases of water among the common border plants. The result is best described in the words of a writer of the time (Anonymous reference, 1862):

> Few flowers have made in so short a space of time such rapid progress in public favour as the Gandavensis varieties of the gladiolus. . . . . The French were beginning to draw our attention to the bulbs, and new varieties were reaching us from the other side, when our gracious Sovereign gave a great impulse to their culture by taking them under her special patronage. Their being placed on the royal table led the frequenters of the Court to follow the example set them, and a demand almost unprecedented in the history of flowers has arisen. Fortunately they increase very rapidly, and hence they are being generally distributed over the country; and before this unhappy war broke out in America were being eagerly sought for there, for one Paris firm this time last year was looking out for 30,000 bulbs to supply one order.

English breeders had not kept pace with their brethren in Belgium and France, and with the exception of the achievements of Dean Herbert and Mr. Cole there is little to record until about 1859 or 1860, when John Standish began to grow seedlings. He continued the work for several years. Many of his varieties were figured by color plates in the floral magazines of the time, but inasmuch as he was not given full credit for his efforts attention should be called to the great number of varieties originated by him. Among these were Adam Bede, Adele Souchet, Agnes, Alice Gray, *Alice Wilson,[12] Aurelian, Bacchus, Basil, Beauty of Bagshot, Belle of Bagshot, Blair Athol, Brian Boru, Bridesmaid, Carlotta Grisy, Carminata, Caroline, Castor, *Charles Davis, Clara, Colleen Bawn, Colonel Hood, Cordelia, Daphne, Diana, Dr. Blount, Dr. Hogg, Donald Beaton, Don Juan, Duchess of Sutherland, Earl Carlisle, Edith Dombrain, *Eleanor Norman, Elfin, Etna, Eugène Domage, Excelsior, Garibaldi, General Cabrera, General Lee, Goldfinder, Guido, Harlequin, Herr Rosenberg, Ivanhoe, John Leach, *John Standish, Joseph Maston, Juliet, Kathleen, Ketterii, *Lady Alice Hill, Lady Caroline Legge, Lady Emily Seymour, Lady Marshall, Lady M. Hood, Lady Morgan, Lemonade, Lord Clyde, Lord Kenlis, Lord Shaftesbury, Lucy Neal, Mlle. Patti, Minerva, Miss Foster, Miss Glegg, Miss Graham, Miss Howell, Miss Ingram, Mr. Duffield, *Mr. J. W. Lane, Mr. Menzies, Mr. Rucker, Mrs. Dix, *Mrs. Dombrain, Mrs. E. Nott, Mrs. Hogg, Mrs. Menzies, *Mrs. Moore, Mrs. Peach, *Mrs. Reynolds Hole, Mrs. Ridley Hunter, Mrs.

[12] The varieties marked with an asterisk have been figured by color plates in the *Florists' Magazine* or similar publications.

Siddons, *Mrs. Standish, Mowbray More, Norma, Oberon, *Our Little Lucy, Poniatowski, Prime Minister, *Randle Jackson, Reine Victoria, Reverend Joshua Dix, Robin Hood, Rose of England, Samuel Weymouth, Scottish Chief, Senior Jackson, Sir Isaac Newton, *Sir James Clarke, Sultane, Susan Ingram, The Caliph, The Cardinal, The Colonel, The Dauphin, The Ensign, Thurza, Tom Moore, Viola, Whipper-in, William Menzies.

These were excellent exhibition varieties, equal if not superior to those sent out in France; but it seems that the conditions were not so favorable for their multiplication, and thus the varieties were never generally distributed and consequently in a few years were lost. Later Mr. Standish moved to Ascot, where he again took up the breeding of gladioli, producing some *brenchleyensis-cruentus* hybrids.

Meanwhile J. Sladden produced some seedlings of merit — Hector, Lord Clyde, Prospero, and Volunteer — which won the first prize of the Royal Horticultural Society in 1863. Although the efforts of Standish served to promote to a certain extent the popular interest in gladioli through exhibitions, there appeared simultaneously with him one who may be regarded as the Souchet of England, James Kelway. Kelway, establishing himself at Langport under different conditions and with a keen judgment of the requirements demanded of new seedlings, was successful; and his successors have maintained the high reputation of the firm for high-grade gladioli. Kelway sent out his first varieties in 1866.

The species *purpureo-auratus*, introduced in 1870, was found to be perfectly hardy at Nancy, France. Victor Lemoine discovered after a test of two or three years that original corms had multiplied so as to form good-sized clumps. The varieties of *G. gandavensis* had not proved successful in the soil at Nancy, and so, very naturally, Lemoine conceived the idea of hybridizing the hardy species with the more brilliant-flowered garden type. He procured some of the best varieties of *G. gandavensis* and used pollen from them on his *G. purpureo-auratus* plants in 1875. The result was three seedlings, of which two were afterward named and the third was suppressed because its colors were not desirable. The hybrids proved to be hardy, like the female parent. Lemoine says that the seedlings were identical in habit, hardiness, height, size and form of flowers, and size and form of the blotches on the lower segments, which were purple bordered with yellow. The named varieties were distinguished by the general color of the corolla, which in *G. Lemoinei* was rosy white and in Marie Lemoine was straw color. These varieties were put on the market in 1880; in 1882 five more varieties were offered, and in autumn of the same year seven varieties were added to the list. In 1881 the English journal *The Garden* called attention to a similar hybrid, called *G. pur-*

pureo-auratus hybridus Froebeli, which very much resembled the variety Marie Lemoine.

Other plant breeders used the *Lemoinei* varieties to cross with the best varieties of *G. gandavensis*. Among these producers were: Deleuil, of Marseilles; Trefoux, of Auxerre; Torcy-Vaunier, of Melun; Souillard and Brunelet, of Fontainebleau; Haage & Schmidt, of Erfurt; and Krelage, of Haarlem.

Although developed simultaneously with *G. Lemoinei*, the hybrid *gandavensis* x *Saundersii* — produced by Herr Leichtlin and known as *G. Leichtlinii* and later as *G. Childsii* — was not generally distributed until after *G. nanceianus*. When the stock of *G. Leichtlinii* passed into the hands of M. Godefroy-Lebeuf, it is said that he sold mixed corms but did not name any of the seedlings of this class. Having purchased some of the stock and having also some corms from Herr Leichtlin, M. Lemoine was aware of the improvement shown in this group and therefore was led to undertake the crossing of *G. Lemoinei* and *G. Saundersii* which resulted in producing *G. nanceianus*. *G. Childsii* (formerly called *G. Leichtlinii*) seems not to have interested European growers, probably because of their interest in the fine varieties of M. Lemoine. In America, on the other hand, the *Childsii* varieties found favor, and through the efforts of American cultivators the flowers have been improved in substance. M. Froebel, of Zurich, in 1889 sent out *G. turicensis*, a variety produced by crossing *G. Saundersii* with *G. gandavensis*, which is the same cross as that made by Herr Leichtlin and therefore has been regarded as the same as *G. Childsii*.

The *purpureo-auratus-gandavensis* hybrids, known in horticultural literature as *G. Lemoinei*, were crossed on *G. Saundersii* (introduced in 1872) by M. Lemoine in 1883. The result was four seeds from which the seedlings afterward named President Carnot and Maurice de Vilmorin were chosen in 1885. These varieties were remarkable for their large flowers and numerous dots of color. The originator claimed that this class was also hardy. The first varieties (nine in number) from this cross were introduced in 1889, and these with other seedlings were shown at the Universal Exposition in Paris in that year. This group has been known as *G. nanceianus*.

G. Victorialis was introduced in 1893 by Dammann & Co., of San Giovanni a Teduccio, near Naples. This variety was described as a hybrid between *G. byzantinus* and *G. cardinalis*, or between a European and a Cape species, and, if correct, it was the first hybrid of such parentage on record. The firm's catalog for 1893 stated that the variety was hardy and belonged to the early-flowering class or group. In habit the plant was intermediate between the parents; the flowers were pink or dark red, and the inner segments were striped as in *G. cardinalis*. The season was about the middle of April and the flowers were somewhat scented.

The class was recommended for market and for cutting, and especially for hybridizing. Five varieties were offered, as follows: Amathusia, Amphitrite, Andromeda, Penelope, Eris. It appears that specimens were sent by Mr. Sprenger, of the firm of Dammann & Co. to J. G. Baker, who described this new gladiolus in the *Gardeners' Chronicle* of May 20, 1893, but ascribed it to a cross between *G. communis* and *G. cardinalis* or *G. Colvillei*. Endicott (1897) says that *G. Victorialis* is not so good as *G. byzantinus*, and that he saw no evidence of African blood. Apparently the class was of little value, since it seems not to have been cataloged by the introducers for more than a year.

When the above-named specimens were sent by Mr. Sprenger to Mr. Baker there was included a *papilio-gandavensis* hybrid, which was described. Later Mr. Sprenger sent six hybrids, as follows: *communis* x *Colvillei*; *communis* x *Colvillei albus*; *communis* x *cardinalis*; *ramosus* x *cardinalis*; *papilio* x *cardinalis*; *papilio* x *angustus*. These were not described, and the writer could not ascertain whether or not any of them found their way into the market. They are of interest to botanists and plant breeders in view of Dean Herbert's opinion regarding the possibility of uniting the species of Europe and South Africa.

Another interesting class of gladioli was the *Glaïeuls à épi rond*, the first varieties of which, Triomphe de Paris and Mme. Casimir-Perier, were introduced by Cayeux et Le Clerc in 1902. These gladioli with flowers all around the stem were a novelty, and the following additional varieties were sent out: Eureka (Lem., 1903); Triomphe de Nancy (Lem., 1905); Caprice (Lem., 1906); Couronnement (Lem., 1908). They were of passing moment, however, and have almost disappeared.

In 1905 Roger de la Borde exhibited his Giant-flowered Hybrids, which he claimed were the result of crossing several species with a very severe selection of the seedlings. The flowers were large, some of the varieties having flowers twenty-two centimeters in diameter, while the American varieties under the same conditions were only thirteen centimeters. The colors were delicate. The spikes were furnished with from four to six flowers open at one time.

G. primulinus, which flowered at Kew in 1890, has in recent years been used in hybridizing with other races and species of gladioli. This species seems to have come into commercial notice in France in 1905, and in the United States through Thorburn in 1908. Cayeux et Le Clerc obtained a number of seedlings of *G. primulinus*, using different and more or less yellow-flowered varieties of *G. Lemoinei*, *G. nanceianus*, and *G. gandavensis*. They also made reciprocal crosses. Crosses with such *gandavensis* varieties as Hohenzollern and Safrano gave the best results. Seventy per cent of the seedlings were yellow and hooded, as in the type. The *nanceianus* crosses gave less pure colors, the flowers being striped with shades of

red and in several cases with novel shades of copper or coppery bronze. With the *Lemoinei* variety Henry Lemoine, the seedlings ranged in color from almost pure yellow to pure yellow, but retained the pronounced hooded upper petal.

These first hybrids were crossed with the largest yellow-flowered *gandavensis* varieties. The resulting hybrids, flowering in 1909, had large, well-open flowers, in colors ranging from clear yellow to golden yellow. In addition, distinct salmon and chamois shades appeared, which offered a field for further work in gladiolus development.

Langprim gladioli is the name given by Kelway for his strain of *primulinus* hybrids produced by crossing with varieties of *G. Kelwayi* and *G. gandavensis*. *G. primulinus* used on the *Kelwayi* varieties has thus far given the best results. The seedlings show marked *primulinus* characters, especially in regard to color and form, giving a series of colors ranging from lemon-white to orange, suffused with red.

Lemoine evidently began experimenting with *G. primulinus* soon after its introduction into Europe, and in the autumn of 1908 he offered *G. primulinus major*, *G. primulinus maculatus*, and *G. primulinus salmoneus*. In 1910 he sent out *G. primulinus concolor* and *G. primulinus erectus*.

Recent development in the gladiolus is marked by the attempt of the French gladiolus breeders to produce a type that will flower in the interval between the early dwarf varieties, *G. Colvillei*, *G. communis*, and *G. segetum* on the one hand, and *G. nanceianus* on the other.

About 1902 M. Porcher-Dionneau, of Ponts-de-Cé, conceived the idea of crossing *G. nanceianus* with *G. Colvillei* to produce an earlier-flowering strain. Each year he selected from the seedlings those that flowered first but that retained the rich coloring and large size of *G. nanceianus*. He exhibited his varieties in 1910 and they are figured in the *Revue Horticole*, where it is stated on M. Porcher-Dionneau's authority that, when planted with *G. Colvillei* in March, the *Glaïeuls hâtifs Ponts-de-Céais* flowered at the same time, but the flowers measured from sixteen to twenty-two centimeters in diameter and had the rich colors of the *nanceianus* class.

Cayeux et Le Clerc, in 1913, introduced *G. vitriacensis*, a hybrid between a *Lemoinei* variety and some of the early dwarf hybrids known as *G. nanus*. The plant grew one meter high and bore medium-sized flowers having the characteristic blotches of the dwarf type. The period of bloom was in the interval between the season of the early-flowering varieties and the late-flowering group.

These results indicate that where the dwarf types are hardy it is possible to have gladioli in the open ground from April or May until the latest of the tall late varieties are over — a period of six months.

The parentage of some of the principal hybrid species is shown in the following table:

psittacinus x floribundus
brenchleyensis (Hooker)
psittacinus x oppositiflorus x cardinalis
gandavensis (Beddinghaus)
cardinalis x tristis concolor
ramosus x cardinalis
Colvillei
cardinalis x byzantinus
formosissimus
Victorialis (Dammann)
gandavensis x psittacinus
massiliensis (Deleuil)
purpureo-auratus x gandavensis
Lemoinei (Lemoine)
Saundersii x gandavensis
turicensis (Froebel)
Lemoinei x angustus
Colvillioides (Lemoine)
Lemoinei x nanus
vitriacensis (Cayeux)
dracocephalus x Lemoinei
dracocephalus hybrids (Lemoine)
Lemoinei x Saundersii
nanceianus x gandavensis (Lemoine)
Excelsior (Barr)
Lemoinei x papilio
Blue hybrids (Lemoine)
Childsii x cruentus (Leichtlin)
princeps (Van Fleet)

HISTORY OF GARDEN SPECIES

Gladiolus alatus Linn. (Wing-flowered Gladiolus) is a native of the Cape of Good Hope and was among the first species introduced into Europe. The corm is round, compressed, and small, about the size of a small crocus. The leaves are from three to four in number, narrowly sword-shaped, somewhat leathery, without a middle nerve but streaked with parallel fine furrows. The stem varies from a few inches to a foot in height, and bears from five to ten flowers. The segments are very unequal, the uppermost being one-half the width of the two lateral ones and the lower segments narrower. The flowers are bright red, and small like those of sweetbrier. Ker thinks that presumably the specific name was suggested to Linnæus by the extended wing-like appearance of the upper lateral segments of the corolla, rather than by the somewhat winged stems. Although it is one of the so-called hardy species, it endures but little cold; yet, on the other hand, it cannot be kept out of the soil except for a short period. According to Ker it is propagated very easily by seeds and cormels, although it is not so easily brought into flower, which he attributes to lack of sufficient heat.

This species is common in the western coast districts of South Africa, where it flowers in the spring. In the south it inhabits the low hills and flats; in the north, due to the less amount of rainfall, it is not found on the plains, but only on mountains in locations where soil and moisture are congenial to it. When the plant is not set deep enough it throws out several anchor roots which, according to Marloth, serve, when shriveling at the beginning of the dry season, to drag the new corm downward until by a series of annual descents the plant has reached its proper depth.

G. angustus Linn. (Narrow-leaved Gladiolus) was one of the first (if not the very first) of the African species to be introduced into Europe. The leaves are narrow, upright, shorter than the stem, and with a single prominent midrib. The stem is from one to two feet high. The flowers are from three to five in number, about four inches long, straight, narrow funnel-form, one-ranked, and scentless. The three upper segments are broad, the middle one being the broadest, the lower ones rather narrower, all flat and spreading. The color is usually described as white, and the lower segments are marked by a spade-shaped purple blotch. The color plate in *Curtis's Botanical Magazine* (tab. 602) shows a red blotch with a distinct eye of the same color as the segment, and the spot is connected with the base by a red line down the center of the petal. The flowers appear in June. This species, says Ker, propagates easily by seeds or cormels. The species was probably first noticed by Breyne, and was

described and figured by Linnæus in *Hortus Cliffortianus* in 1737. It was cultivated by Miller in 1757.

G. atroviolaceus Boiss. was introduced in 1889. It is therefore not very well known commercially. The plant grows from one to one and one-half feet tall, bearing linear, closely ribbed leaves. The spikes are not thicker than a slender pencil and bear from four to eight flowers. These are narrow and tube-like, with a small hood, and the colors are navy blue, purple, and white. Fuld (1912) reports that corms of this species planted in a cold frame in October and covered during the winter with sash, were discovered in active growth in March. Later the sash were removed, and the plants flowered on May 15. Bulbs planted in a greenhouse in December, according to Fuld, were in flower within two months. While the stems were not so long as those on the plants grown in the cold frame, the flowers were as graceful. If this proves to be the general experience, there can be no doubt as to the usefulness of this species for growing under glass, and it may prove a foundation for the development of a true forcing type.

G. blandus Ait. (Fairest Gladiolus) has corms of medium size. The leaves are sword-shaped, nerved, and shorter than the stem, which is from one to two feet high and bears from three to ten large flowers. The segments vary much in size and form in the different varieties; the lower segments are the narrower. The perianth is white, tinged with red, the lower segments with a reddish blotch at the throat. The flowers appear in June and are scentless. The plant blooms freely and propagates readily by both seed and cormels. The species was introduced into Kew in 1774 by Masson. In the figure of the species in *Curtis's Botanical Magazine*, the plant is shown with conspicuous red lines or markings on the spathes.

G. blandus var. *albidus* Jacq. (Snow-white Gladiolus) has stems one foot long, which bear three flowers. The flowers are almost pure white, there being only a very light stain on the backs of the petals before they expand.

G. blandus var. *carneus* De la Roche (Pale Purple Gladiolus), known in the early lists as *G. campanulatus* Andrews, is a more robust form, with larger, lilac or mauve, flowers. The upper segments are broad and overlap one another; the lower ones are narrower but overlap, are lighter in color than the upper segments, and are marked by a crescent-shaped red spot. This form was introduced in 1796.

G. blandus var. *excelsus* Sweet is a taller-growing and larger-leaved form of the species.

G. blandus var. *Hibbertii* Hort. has pink flowers with very distinct spade-shaped blotches on the three lower segments.

G. blandus var. *Mortonius* Herb. has stems one and one-half feet long. The flowers are white, with copious faint vertical streaks. The variety was introduced about 1835.

G. cardinalis Curt. (Superb Gladiolus), a beautiful Cape species, was given its common name because it grows from three to four feet high, bearing from twelve to twenty bright scarlet flowers, with the lower segments of the perianth marked by a large diamond-shaped white blotch. It is figured in *Curtis's Botanical Magazine*, tab. 135 (1790), where the statement is made that the species was introduced into England from Holland by Graffer and was first flowered by Lewis & Mackie at Kingsland. Aiton says it was introduced by Graffer in 1789. The species flowers in July and August. It is just hardy in England, and dampness affects the corms—which, however, are intolerant of being out of the ground long, and consequently it was the practice of growers to plant this species in the fall. Allen says it rarely flowers if planted in the spring.

This species is one of the parents of *G. Colvillei*, *G. ramosus*, *G. pudibundus*, *G. candidus*, and *G. incarnatus*. It is thought by some to be a parent of the *gandavensis* race, but the plant-breeding evidence, and to a certain extent the characters of the early varieties of this type, are against this being a fact. A rose-colored variety called *subroseus* was raised from *G. cardinalis* by Jacques in 1847 from seed produced in 1844. According to Marloth, this species is found on the moist cliffs and grassy ledges of waterfalls in the Wellington, Paarl, and Frenchhoek Mountains, flowering in midsummer (January). The corm is small but is provided with numerous long, thin, much-branched roots, which spread widely in the boggy soil. The species appears to flourish under conditions favorable to *Disa uniflora*, and sometimes the two may be found flowering together. The flowers are bright scarlet and crimson; the uppermost petal, the largest and hooded, is somewhat paler; the three lower petals and sometimes those adjoining them have a white blotch. The flowers are faintly scented like some lilies. In nature the plant hangs from cliffs, the stems are from three to four feet long, the leaves are from two to three feet long, and there are from five to ten flowers on the hanging spike. Whether the spike is hanging downward (as found under natural conditions) or is cut and placed in an upright position in water, the flowers are always in the normal position — that is, with the hooded segment uppermost. This is due to a turn of the tube which enables the flowers to adjust themselves to conditions under which the individual buds open, and appears to be an adaptation for butterflies and birds, which visit the flowers for the nectar in the narrow tube and accomplish fertilization of the flowers by brushing against the stamens or the stigmas that arch over underneath the hood.

G. cruentus Moore (Blood-red, or Bloody, Gladiolus) was introduced into England by William Bull, of Chelsea, in 1868. In his catalog for 1871 he offered the novelty and thus describes it:

> A very beautiful and entirely novel species of this popular genus introduced from Natal. It is not only a very showy plant, but also one of a very distinct character and is an acquisition for the flower garden on account of its vigorous habit of growth and large brilliantly coloured flowers. It produces a tall scape, two feet high or upwards, furnished with long flag-like glaucous leaves nearly an inch wide, the scape terminating in a distichous spike of large, broadly campanulate, subringent flowers of a bright blood-red colour, the upper segments uniformly coloured and the lower smaller ones crimson at the base and scarlet at the apex. The two lateral segments of the lower lip are marbled about halfway down with a white zone dotted with crimson, which on the exterior edge runs out into a long point, like the flame of the Florist Tulip. This distinct species has been figured both in the *Botanical Magazine* and in the *Florist and Pomologist*. The price per corm is one guinea.

The flowers are from six to ten in number and appear late in September. The spikes possess the valuable quality of developing after being cut and placed in water. The corms are distinguished by their bright yellow color, globular form, large size, and thin covering.

This species is very sensitive to soil conditions, but, according to Van Fleet, if healthy corms are planted in nearly pure sand with a stratum of peat for a root run, kept fairly moist, and afforded plenty of sunshine, the plants will be strong and leafy with plenty of bloom. The plants will not grow in clay soil and seldom thrive in rich garden loam.

The first hybridizer to use this species was John Standish, of Ascot, England, who in October, 1871, exhibited a *brenchleyensis-cruentus* hybrid before the Royal Horticultural Society. The following year this hybrid was named Alice Wilson. A color plate of it appears in the *Florist and Pomologist* for 1873, page 73. T. Moore says it has more the form of a lily than that of an irid. The flowers were comparatively small, with a white center, a marginal coloration of rosy carmine, and little of the flame-like marking on the lower perianth segments, thus rendering the lily-like illusion all the more striking.

G. princeps was originated by Van Fleet from *G. cruentus* crossed with *G. Childsii* (*G. gandavensis* x *Saundersii*). This variety, says the originator, almost exactly reproduces the crimson-scarlet coloring with white and cream feathering in the lower segments, but the flat, circular flower is expanded to six inches in diameter both ways. The plant also is doubled in size in all its parts. This hybrid retains the peculiarity of *G. cruentus* in producing blunt-appearing spikes with apparently few flowers. Growth continues, however, until sometimes as many as twenty flowers are produced. The spikes show something of the same tendency when cut and placed in water that is kept fresh by frequent changing.

G. cuspidatus Jacq. (Tall Gladiolus), a native of Cape Colony, was introduced more than a century ago. The corms are small, being less than three-fourths of an inch in diameter. The three leaves are narrow, flat, and rigid. The stem is from two to three feet long. The flowers vary from four to eight in number. The segments are shorter than the tube, and generally waved. The upper segments are broadest; the uppermost one is nearly straight, but is recurved at the end. The color, according to Baker, is white or pale pink, with a spade-shaped blotch on each of the three lower segments. The plate in *Curtis's Botanical Magazine* for 1802 (Ker, 1749–1825, tab. 582) shows a yellowish white flower, with blotches of red, white center, and margins of purple; the anthers are shown as blue. The flowers appear in May. This species was introduced into Europe in 1785.

G. dracocephalus Hook. f. (Dragon's Head Gladiolus), a Natal species, was introduced by Wilson Saunders and flowered at Reigate, England, in August, 1870. It was discovered by Cooper in that part of Natal west of the Drachenberg Mountains. The flowers are yellow-green closely striped with dull purple-red on the upper segments, and bright green spotted with purple on the lower segments, which are much smaller and are recurved. The two outer segments are wing-like with recurved tips; the upper segment is arched and hooded. The stem is one and one-half feet high, bearing from five to seven flowers. This species has been used in crossing with *G. gandavensis* and *G. Lemoinei*.

FIG. 9. GLADIOLUS DRACOCEPHALUS

G. grandis Thunb. (Large Brown Afrikander) is found in the western part of Cape Colony, where it flowers in the spring. The larger flowers are sweet-scented in the evening. The perianth is yellowish, more or less tinged with purplish brown. The flowers vary from one to five, on stems from two to two and one-half feet long. The two or three leaves are strongly ribbed. The corms are small, from one-half to three-fourths inch in diameter.

Marloth (1915) distinguishes between *G. recurvus* and *G. maculatus* Sweet (Small Brown Afrikander). The latter, though similar in shape and color of flower to *G. grandis*, is only about half the size, and flowers in the autumn (May–June in the South Temperate Zone). The color is a deeper brown. Marloth says it is readily known by its extremely strong, almost narcotic, scent, which is especially noticeable in the evening. Baker makes *G. maculatus* Sweet a synonym of *G. recurvus*, but Marloth says *G. recurvus* has a pleasing fragrance and a different season of flowering, as well as a different form of leaves.

G. oppositiflorus Herb. is found in Transkeian Kaffraria, not, as Herbert supposed, in Madagascar; no collector has found it in the latter country. The corms are large. The leaves are from three to four in number, sometimes as many as six, crowded, ensiform, glabrous, and shorter than the stem. The whole plant is usually three feet tall, and occasionally five feet. The flowers number from thirty to forty in a dense, two-ranked spike. The flowers are large, and white with mauve-purple or amethyst stripes. Van Fleet says this species is of tall growth, bearing from eighteen to twenty-four blooms almost simultaneously, of delicate peach and white tints. The species has been looked upon as the parent of the light-colored *gandavensis* forms, and plant breeders have sought to obtain the long-desired, meritorious, pure white variety by continued crossing of the best white varieties with the purest white seedlings of this species. The results indicate that such pure whites as have been obtained are of low vitality and reproducing power.

This species was described by Dean Herbert (1842), but had already been noted by him in his work on the Amaryllidaceae in 1837. Herbert called attention to the fact that the species was sold by Dutch nurserymen under the name of *G. floribundus*, an old name for a different plant — *G. floribundus* Jacq. The same plant was known as *G. flabellifer* Tausch, and Tausch (1836) states that *G. floribundus* Hort. Holland (non Jacq.) is a synonym. The citation of the same synonym seems to leave little doubt that the same species was under consideration, especially when there is nothing contrary in the descriptions.

The reference just given indicates some of the difficulty of determining what species were used in hybridizing. An illustration of *G. oppositiflorus*

was published in *Curtis's Botanical Magazine* from specimens collected more recently, but it is there stated that the plant was identical with herbarium specimens left by Herbert.

G. primulinus Baker is from Usagara Mountains, in Africa, and was first flowered at Kew in 1890 from corms sent by J. F. Last, who discovered it in 1887. It was reintroduced by Francis Fox, who procured some plants from Rain Forest, Victoria Falls, and flowered them at Wimbledon, England. C. E. Allen says it grows in "one of the wettest spots near the Falls in a perpetual deluge." When this species was introduced it was regarded as a distinct species, but later it was referred to *G. Quartinianus* A. Rich., which was introduced into cultivation by Sir John Kirk in 1884. The clear, uniform primrose color of the flowers, without any tendency toward markings, warrants its retention for horticultural purposes. At least *G. primulinus* has now become better known than *G. Quartinianus*, and in garden literature it will doubtless be retained.

G. psittacinus Hook. (Splendid Corn Flag) is from the Cape and has been called the parrot, or perroquet, gladiolus. In Holland it was early known as *G. Daeleni*, after Dr. Dael, of Brussels, who is said to have been the first in Europe to flower it. Reinwardt named it *G. natalensis*, and under one or the other of the latter names it appears in early literature. It was first flowered in Great Britain by Richard Harrison, of Liverpool, in 1830, from corms procured from Prince de Salm-Dyck. The species was figured in the *Botanical Register* (1831), tab. 1442, and in *Curtis's Botanical Magazine*, tab. 3032.

Sweet (1832–35) figured and described this species under the name *G. natalensis* Reinw., Natal Corn Flag. He says it was "introduced by Professor Reinwardt, of Leyden, who has liberally distributed bulbs of it to various collections both in this country and on the Continent. It is by far the largest in growth, and in beauty of its flowers it is not surpassed by any others of the genus. The plant seems to be quite as hardy as *G. byzantinus* and requires the same soil and treatment as that species." *G. psittacinus* is one of the parents of *G. gandavensis* Hort.

G. psittacinus var. *Cooperi* Baker has segments more acute than in the type, and the tube is from two and one-half to three inches long.

G. purpureo-auratus Hook. f., from Natal, was introduced by William Bull, of Chelsea (who also introduced *G. cruentus*), and was first flowered in England in August, 1871. This is the hardiest of the African species. The corms are large, and the cormels are produced on the ends of running rootstocks. The leaves are somewhat glaucous, narrow, and stiff. The stems are from one and one-half to two feet tall. From ten to fifteen blooms are borne in one rank on the spike. The color of the flowers is greenish yellow, with a diamond-shaped maroon blotch on the two

lower segments. The flowers are bell-shaped and the spikes bow-like. This species is valuable, not for its beauty, but as a parent of garden forms. It was used in the development of *G. Lemoinei*.

G. recurvus Linn. (Violet-scented Gladiolus) is a native of Cape Colony, and was grown by Miller from seed and flowered at Chelsea before 1760. The stem is from one to two feet tall, is slender, and bears three strongly ribbed leaves. The flowers are from two to six in number, sulfur-colored, suffused and broadly edged with lilac, and with three stripes on each petal. The flowers are very fragrant, with a scent described by some writers as similar to that of violets or orris root. The species flowers in the northern hemisphere in April and May. This species is considered the most fragrant of the genus. It is somewhat intolerant of moisture when not in flower, but otherwise it never fails to bloom when the corms attain proper age. Marloth, who distinguishes between this and *G. maculatus* Sweet, says the three upper segments are broader than the lower, and are pale or dark lilac, and the lower segments are yellow with mauve or lilac points and similar streaks. The plant is frequent in the Cape flats and elsewhere, where it flowers in the spring (August) and is known by the common name *Mauve Afrikandes*. This species was introduced into Kew in 1774, where it was named *G. carinatus*. Miller's description is full and complete, but his figure is incorrect as the stem is not branched.

G. tristis Linn. (Sad-colored Gladiolus), an African species, was given its name by Linnæus because of the color of its flowers, which, however, are scarcely somber enough to deserve the name. The color is pale yellow, with dark brown spots. The blossoms are sweet-scented from dusk to dawn. The flowers appear in April and May on stems one and one-half feet high. The leaves are linear, four-sided, and furrowed. This was one of the first species brought from the Cape, and was cultivated by Philip Miller as early as 1745.

G. tristis var. *concolor* Salisb. was formerly known as *G. concolor*. This plant is so named because of the almost concolorous white and pale yellow flowers. Like the type, it is fragrant in the evening. The foliage has the peculiar characters of *G. tristis*. Like the type also, it endures little cold, and because of its early flowering must be grown in a frame.

HYBRID GLADIOLI

The variety Bellona is a hybrid between *G. cuspidatus* and *G. papilio*, raised and introduced by Dammann in 1899. In his catalog for the year Dammann described it as "an early-flowered gladiolus of most peculiar form and color. Leaves green, narrow and lanceolated, stalk about sixteen inches high, very rich-flowered. Petals long, rolled and

pointed; leaves dark salmon, steel blue with black spots. A new gladiolus not yet seen."

G. brenchleyensis is usually considered a form of *G. gandavensis*, although the persistency with which it has retained its individuality through a period of more than sixty-five years might lend weight to the belief that it is more than *G. gandavensis*. The early history of *G. brenchleyensis* is not definitely known. In 1848 this variety was recorded as a hybrid between *G. psittacinus* and *G. floribundus*, raised by Mr. Hooker, of Brenchley, about 1846.[13] The stock, or a considerable proportion of it, passed into the possession of the Youells, of Yarmouth, who were for years the largest growers of *G. brenchleyensis* in England. Their notable displays of this hybrid did more to direct the attention of the public to the merits of this excellent variety than did the efforts of any one else. The flowers are vivid scarlet, with pencilings of yellow in the throat. They are only medium in size, but the great number open at one time produce a brilliant effect. The plant is therefore very useful in the garden, where it is a vigorous grower. It is considered by many growers to be the best scarlet variety, and is grown for its good color for table decorations. In Europe this gladiolus is often recommended for bedding with *Galtonia candicans*. Barr, in 1905, introduced Mikado, a sport of *G. brenchleyensis* which was described as having flowers of a pale blush-rose shading to cream, with the lower petal striped crimson on a primrose-colored ground.

G. candicans is a *blandus-cardinalis* hybrid producing a pure white flower of good size and appearance. This was raised by Mr. Miller, of Bristol, about 1837.

G. candidus is a hybrid between *G. blandus* and *G. cardinalis*, raised by Mr. Miller, of Bristol, about 1837, and figured in Smith's Floral Magazine.

G. Childsii has been one of the most important types in America. It is a hybrid between *G. gandavensis* and *G. Saundersii*, originally produced by Max Leichtlin, of Baden-Baden, Germany. Leichtlin was perhaps the first to appreciate the value of *G. Saundersii*, which he used in 1874 in crossing with some of the best varieties of *G. gandavensis*. The first flowers appeared in 1877 and the influence of the cross was especially manifest in the size of the flowers, which, according to Leichtlin, measured four inches across. The results of this hybridization work were reported in 1882.

Leichtlin appears to have disposed of his stock in the autumn of 1882 to Godefroy-Lebeuf, of Argenteuil, France. This new class of hybrids, however, seems not to have met with favor at the hands of European

[13] George Bunyard stated in 1910 that his firm obtained *G. brenchleyensis* from Hooker and sold it to the Youells. Henry Youell (1911), in an address before the American Gladiolus Society, gives an entirely different account of its origin.

growers, who were attracted by the new *Lemoinei* group, and corms of *G. Leichtlinii* Hort. passed into other hands. The stock was purchased in 1884 (Childs says 1887) by V. H. Hallock, who continued to raise seedlings until 1891, when he sold the entire stock to John Lewis Childs. Until that time these gladioli were usually known as *G. Leichtlinii*, after the originator; but as none of the stock was in the hands of commercial growers, Childs decided to change the name of the group to *G. Childsii*, and under this name he sent out the following varieties in 1893: Ben Hur, Columbia, Dr. Sellew, Henry Gillman, Mrs. Beecher, William Falconer. These were shown in a color plate in Childs' catalog for the year mentioned. The price was one dollar per corm, or five dollars for the set of six varieties. In 1894 the varieties Aurea Superba, Mrs. La Mance, Ruby, Splendor, Torchlight, and Tuxedo were added. No varieties were added the following year, but in 1896 thirty-four varieties were introduced. Thirteen were added in 1897, seventeen in 1898, and twelve in 1899.

Since 1899 many varieties have been sent out, and, while it is probable that at present there is not a distinct *Childsii* group except in so far as it is represented by some of the original varieties remaining in the market, it can be safely said that this group revolutionized gladiolus culture in America. Although the first varieties sent out were not favorably received by European and some American growers, nevertheless the general superiority of these varieties to the *gandavensis* varieties was recognized, and *G. Childsii* served as a foundation for further improvement by American hybridizers.

G. Colvillei is generally regarded as a hybrid between *G. cardinalis* and *G. tristis* var. *concolor*. Dean Herbert thought it was a hybrid between *G. cardinalis* and *G. blandus*. The variety originated with Mr. Colville at Chelsea in 1823. Sweet (1826-27) states that it was raised by Colville from seeds of *G. concolor* that had been fertilized by the pollen of *G. cardinalis*. He publishes a color plate of the flowers and gives the following description of the plant:

> Stem slightly flexuose (in our specimen about 18 inches in height), leafy, slightly angular, glaucous. Flowers secund or all facing one side. Perianthium tubular, ringent with a six-parted spreading limb, of a bright red, with pale purple margins; tube scarcely as long as the spathe in the lower flowers and rather longer in the upper ones, bent forward near the limb; laciniæ unequal, obtuse, upper one more than double the size of the others, elliptic, slightly twisted or incurved near the point, the others oblong with the margins also incurved or involute near the points; three lower ones marked with a white spot which is lanceolate in the lower one and ovate in the others running down in a narrow line to the base of the laciniæ, on each side of which it is bright purple. Pollen white.

Baker (1892) describes this hybrid as having "bright scarlet sub-erect flowers, with oblong acute segments, with a lanceolate blotch of bright

yellow at the base of the three lower." The color as shown in the color plate in *Flore des Serres* (Van Houtte, 1873) shows yellow blotches bordered with white, which contrast with the bright color. The flowers of *G. Colvillei* are fragrant, which points to *G. tristis* or *G. tristis* var. *concolor* as one of the parents.

The white variety of *G. Colvillei* seems to have been discovered about 1872. It is said to have appeared as a sport in two horticultural establishments in Holland in the same year. It was figured, together with *G. Colvillei*, in *Flore des Serres* (Van Houtte, 1873). The plate shows a pure white variety with yellow lanceolate blotches on the lower segments. This sport, known as *G. Colvillei albus*, had colored anthers and was supplanted later by the variety with white anthers known commercially as *G. Colvillei* The Bride.

G. Colvillioides, a hybrid produced by crossing a variety of *G. Lemoinei* with *G. angustus* (the latter a form closely related to *G. tristis*), resembles *G. Colvillei* but has yellow flowers. The leaves are long and straight, with prominent ribs. The stems are slender and erect, and bear medium-sized flowers. The color is a pure chrome yellow, with three triangular black spots or blotches. The normal time of flowering is the early part of July, but if the corms are planted in the autumn and protected during the winter by glass frames they may be made to flower with *G. Colvillei*. This hybrid was originated by Lemoine and was offered as a novelty in the autumn of 1903.

G. delicatus is a hybrid between *G. recurvus* and *G. blandus*, raised by Dean Herbert.

G. dracocephalus has long been known, but seems not to have been employed in hybridizing until recent years. Jackson (1889) described the *dracocephalus-gandavensis* hybrids of C. Sander as being of great size, strong, and floriferous. He states that a large proportion bear flowers entirely free from the stripes in the lower petals common to *G. gandavensis*. This is due to the *dracocephalus* blood and is a step toward self-color. Whether these hybrids were introduced is unknown.

The veteran hybridizer, Lemoine, offered his *dracocephalus* hybrids in 1900. These were produced by crossing *G. dracocephalus* and some of the varieties of *G. Lemoinei*. The form of the flowers indicates their origin, while the singular spots, or macules, produce a striking effect. The first varieties sent out were Cheret, Forain, Léonnee, Luc-Olivier Merson, Paul Baudry, and Roty. Since 1900 other varieties have appeared each year. A list of these varieties, together with the dates of their introduction, follows:

Arlequin	1904	Le Masque	1904	Ribera	1902
		Léonnee	1900	Rigoletto	1908
Benvenuto Cellini	1902	Louis Français	1901	Robinson	1904
		Luc-Olivier Merson	1900	Rodin	1908
Cham	1900			Ronsard	1903
Chaplain	1901	Mars	1900	Roty	1900
Cheret	1900	Mascaraade	1907		
Crafty	1900	Michel-Ange	1902	Semaphore	1901
		Miracle	1907	Spirite	1907
Daumier	1900	Misanthrope	1906		
Dubufe	1901	Mohican	1908	Tabarin	1903
		Mystère	1904	Tharsis	1906
Eugène Manuel	1901			Thebiade	1906
		Nabab	1906	Turlupin	1906
Falguière	1908	Nostradamus	1907	Tyran	1907
Fatalité	1907				
Figaro	1906	Papillon	1904	Ugolin	1907
Forain	1900	Paul Baudry	1900		
Fragonard	1904	Pierre Gringore	1903	Velasquez	1902
François Villon	1913			Vendetta	1908
		Quasimodo	1904	Virgile	1902
Henriot	1900				
		Rabelais	1903	Watteaw	1904
Illusion	1907	Radiant	1901	Werther	1902
				Willette	1900

Early Gladioli, Glaïeuls Precoces, are hybrids produced by Lemoine and offered by him in his catalog no. 149, for 1901–1902. It is there stated that these varieties are hybrids between some of Lemoine's earliest varieties and the little-known species *G. Leichtlinii* and *G. aurantiacus*. This race flowers, it is said, about a month in advance of the earliest of the previously introduced varieties. When set out in April the plants flower in June; and if set out in the autumn with the protection of a glass frame, they develop their flowers at the same time as *G. Colvillei*. The varieties offered in the autumn of 1901 were Eclaireur, Mesager, Pleiade, and Précocité. Since these were introduced there have appeared the following:

Alhambra	1906	Favori	1904	Melusine	1910
Aurora	1908	Fraicheur	1905	Oasis	1908
Brasier	1905	Giralda	1906	Parnasse	1910
Calchas	1910	Grenade	1906	Phenix	1905
Carmen	1906	Gyges	1910	Success	1905
Couquete	1908	Melrose	1908	Vision	1904
Emblème	1910				

G. excelsior covers hybrids of the best varieties of *G. gandavensis* crossed with *G. nanceianus*. The flowers are described as very large and open, ranging in color from salmon-scarlet to soft blush-rose with a scarlet or cream-colored blotch, or a crimson blotch on a white ground. Barr offered these varieties as a new strain in his catalog for 1903.

The name *Express Gladioli* has been applied to the crosses of *G. alatus* with *G. cuspidatus* produced by C. G. van Tubergen, jr., of Haarlem, Holland. Van Tubergen (1907:440) describes them as follows:

A selection of crosses between *G. alatus* and *G. cuspidatus* are dwarf-growing, very free-flowering gladioli which flower in the open ground quite three weeks before the

earliest of the *nanus* or *ramosus* sections, which, as is well known, precede the *gandavensis* and other strains in time of flowering from three to four weeks. These *alatus* × *cuspidatus* gladioli, apart from their usefulness in flowering so early in the open ground (end of May), are very welcome additions to the gladiolus family, as each bulb produces from two to five spikes of about a foot in height, with flowers of fair size and of a charming colour of rosy-salmon with golden-brown markings. They are admirable for filling small glasses for table decoration, and other choice floral work. This strain I named "Express."

G. formosissimus is a hybrid uniting the abundant flowering of *G. ramosus* with the colors of *G. cardinalis*, though not so brilliant as the latter. It first flowered in 1842, and for many years was one of the leading varieties of the early-flowering group.

G. fragrans is a hybrid between *G. recurvus* and *G. tristis*, raised by Dean Herbert. The flowers are variegated and sweet-scented. The plant is moderately hardy.

G. gandavensis is probably a hybrid between *G. psittacinus* and *G. oppositiflorus*. It was originated by M. Beddinghaus, gardener to the Duc d'Aremberg at Enghien, who made some crosses in 1837. One of the resulting seedlings, which was much admired by all who saw it, passed into the control of Louis van Houtte, of Ghent, who named it *G. gandavensis* and introduced it in his catalog no. 6, for 1841. He described it in glowing terms, as follows: "In stateliness and color it exceeds all others we have seen among gladioli. Its dimensions surpass *ramosus*; its majestic flowers to the number of eighteen or twenty are of the most charming vermilion; their inferior petals, adorned with chrome, amaranth, and brown, are relieved by anthers of an azure blue which descends to the center of the flower. At the moment I write all Ghent comes to admire it." Van Houtte thought it a hybrid between *G. psittacinus* and *G. cardinalis*, but this is doubtful.

This variety was the foundation of a new race which has been known as *Gladiolus gandavensis*. Probably two thousand varieties have been named and sent out. This group led all others for garden planting from about 1850 to 1880, when the *Lemoinei* varieties came in, closely followed by the *nanceianus* and *Childsii* varieties. It is still important, and may be regarded as holding a position in gladiolus development in some respects analagous to that of the hybrid perpetual roses in the evolution of garden roses.

G. haylockianus is a hybrid between *G. recurvus* and *G. blandus*, raised by Dean Herbert. Mrs. Loudon describes the flowers as pale and slightly variegated.

G. Herbertianus is a hybrid between *G. tristis* and *G. spofforthianus*, raised by Dean Herbert.

G. incarnatus is a hybrid between *G. blandus* and *G. cardinalis*, raised about 1837 by Miller, of Bristol. It produces large, well-formed flowers of a pale pink color.

G. insignis is described in *Paxton's Magazine of Botany* (volume 7, pages 223 and 224) as a handsome hybrid with very long narrow leaves, and apparently drooping flower stalks on which the blossoms are borne chiefly on the upper side. The flowers are of a rich reddish crimson hue, with a dash of bluish purple in the center of the lower segments of the perianth. The parentage of this hybrid is unknown, but it was probably raised by Colville, as it was found in a collection purchased by Lucombe Pince & Co., of the Exeter Nursery, at the sale of Colville's nursery. It flowered with the new owners in July, 1839, and is figured on a color plate in *Paxton's Magazine of Botany*, volume 7 (1840), page 223.

G. Lemoinei (Large Spotted Gladioli) forms a group which had its origin in a hybrid made by Victor Lemoine between *G. purpureo-auratus* and some of the best *G. gandavensis* varieties. The original cross was made in 1875, and three seedlings were obtained, of which two — *Lemoinei* and Marie Lemoine — were named and later sent out. The new hybrids were exhibited at the Universal Exhibition in Paris in 1878, where they attracted considerable attention from amateurs. The two varieties were identical except in general color effect. *Lemoinei* was rosy white and Marie Lemoine straw color, both having on the lower segments large blotches of purple bordered with yellow. The two varieties were hardy, like the female parent, in the open ground at Nancy. In 1880 these varieties were offered for sale, and in 1882 five additional varieties — Lafayette, Cavaignac, L'Abbe Gregiore, John Thorpe, and Rochambeau — were introduced. To these were added, in the autumn of 1882, Enfant de Nancy, Victor Hugo, Stanley, Adeliaque, Cleopatre, Christophe Colombo, Incendie, and Mars.

Varieties with a tendency toward blue appeared early in the development of this type. Gambetta (1885), Emile Galle (1887), Baron Joseph Hulot (1896), represent the successive steps in the development of the blue varieties.

G. Lowii is said by De Jonghe (1843) to have the same parentage as *G. gandavensis*. It was offered by Jacob Makoy in 1842.

G. massiliensis is a hybrid of *G. psittacinus* and *G. gandavensis*, and was announced by Krelage as a new race in 1892. The hybrid was the result of testing the opinion held by some growers, that in order to secure greater vigor and resistance to disease it would be necessary to turn again to the world's species and use these in further crossing. This hybrid had, it was said, all the bad qualities of *G. psittacinus*, and it was apparent that the modern gladiolus had certain qualities resulting from its fifty years of improvement which could not be ignored by plant breeders if their results were to meet the approval of gardeners and florists.

G. mitchamiensis is a hybrid resulting from crossing *G. tristis* and *G. hirsutus*. It is named after Mitchain, where Dean Herbert, who raised it, resided about 1810. The flowers are beautifully variegated, inclining toward *G. tristis*.

G. nanceianus is a hybrid produced by crossing *G. Saundersii* with some of the first *Lemoinei* varieties. The flowers are larger than the *Lemoinei* varieties, well open, and marked with peculiar mottling or with short, fine, often parallel, strokes of contrasting colors. The plants of the different varieties vary considerably in vigor, some exceeding any of the varieties of the other garden groups. The spikes of some of the more vigorous *nanceianus* varieties are often six feet high and bear flowers seven inches across. As in the case of *G. Lemoinei*, the varieties sent out by Lemoine are hardy under conditions similar to those of the place of origin. The first varieties, President Carnot and Maurice de Vilmorin, resulted from the crosses between *G. Lemoinei* and *G. Saundersii* in 1883. The seedlings flowered in 1885 and were placed on the market in 1889. These forerunners of a new type were shown at the Universal Exposition in Paris in 1889, and exhibited in the same year by Veitch & Son at the meeting of the Royal Horticultural Society in London.

G. nanus (Dwarf Gladioli) is the term applied to a number of early-flowering dwarf gladioli which differ from one another in the arrangement of flowers and in the disposition of the spots of color. Most of them are probably derived from *G. cardinalis* and *G. ramosus*, although *G. blandus*, *G. tristis*, and some others are probably concerned. This class has been largely developed by florists of the Channel Islands and in the Low Countries. The literature concerning the varieties is scanty or not readily available. *G. Colvillei* is undoubtedly the oldest variety of this class, and its white form (*G. Colvillei albus*, The Bride) is extensively employed for forcing.

G. odoratus is a hybrid between *G. hirsutus* and *G. spofforthianus*, raised by Dean Herbert.

G. praecox forms a group reported to have arisen from intercrossing the earliest varieties of *G. gandavensis*, *G. Lemoinei*, *G. Childsii*, and *G. nanceianus*. It is said that in color and size the flowers are the equal of those of any other group. The especial merit of this new group is that it can be grown from seed since seedlings flower the first year. The group was originated by Frederick Roemer.

G. princeps is a hybrid between *G. cruentus* and *G. Childsii*, produced by Van Fleet, who gave the history of it as follows (Van Fleet, 1904):

Gladiolus Cruentus has round, widely-opened blooms about two inches across when fully developed, bright blood-red in color, with broad white markings in the throat, particularly at the bases of the lower petals or perianth divisions. It grows two or more feet high, with broad, handsome foliage, with a characteristic droop to the tips

of the leaves. It is usually short-lived under cultivation, thriving best in well-drained peaty soils.

Mrs. Beecher, the pollen parent of *G. Princeps*, I understand, is one of the original *Childsi* varieties grown by the late Herr Max Leichtlin, of Baden Baden, Germany — from seed of *G. Saundersi* pollinated with a superior *Gandavensis* variety. Plants of Mrs. Beecher grow over four feet high with long, straight spikes of widely-opened blooms often five inches across. The color, though disposed very much in the manner of *G. Cruentus*, is rather dull crimson with speckled white throat.

Owing to the similarity of color pattern of the two varieties I made many pollinations in 1895 of *Cruentus* with Mrs. Beecher and seventy-two seedlings resulted, blooming in 1896–7. *Princeps* was the most vigorous and in some respects the most attractive and was so named by Herr Leichtlin, who introduced it to the Botanic Gardens of Europe in succeeding years, on account of its great international value and wide general recognition. I have since made many hundreds of crosses of *Cruentus*, which is a very shy seeder, with the best procurable species and varieties, resulting in some exceedingly handsome hybrids, but have found few worthy to send out as companions of *Princeps*.

The stock of *Princeps* was sold in 1902 to Vaughan's Seed Store for $1000 — a record price at the time, but since greatly exceeded for the stocks of successful novelties — and introduced by them the succeeding year.

Princeps has probably the most extensive list of high awards from representative horticultural societies ever achieved by a Gladiolus variety and is still frequently exhibited and commented on in home and foreign gardening periodicals.

G. propinquus is a hybrid between *G. floribundus* and *G. blandus*, resembling the latter. It was raised by Dean Herbert.

G. pudibundus (Blush-flowered Corn Flag) was figured by Sweet (1832–35), and described by him as follows:

> This is a hybrid, we believe, between *Gladiolus cardinalis* and *blandus* and was raised by the Honorable and Reverend William Herbert to whom we are obliged for the specimen figured in the plate.
>
> Stem from two to three feet high, straight, cylindrical, smooth. Leaves broadly ensiform, acuminate, ribbed, of a pale green. Flowers large, of a brillant rose color, about ten in number, distantly alternate and disposed in a distichous spike. The three lower segments marked with a pale whitish lanceolate spot having a deep red edge. Anthers purple. Filaments and style declinate, white. Stigmas linear-cuneate, notched, concave, copiously papillose.

G. ramosissimus is probably a hybrid. It is mentioned in *Gardeners' Chronicle*, 1842, page 171, as ranking next to *G. cardinalis* and *G. psittacinus* in beauty. The plant is tall, and bears a profusion of pale rosy pink flowers.

G. ramosus (Branching Gladiolus) is a hybrid which originated at Haarlem from seed of *G. blandus* or *G. floribundus*, according to a writer in *Revue Horticole* in 1838. Some persons regarded it as a distinct species from the Cape of Good Hope. These doubtless confused it with the *G. ramosus* of Linnæus, which has since been referred to the genus Melasphaerula Ker. Baker thinks this form is a hybrid between *G. oppositiflorus* and *G. cardinalis*.

The plant is tall, with heavy, broad leaves. The flowers are openly funnel-shaped, bright red, with dark blotches at the base of the three lower segments. The flower has a general resemblance to that of *G. blandus*. This type blossomed later than the varieties of the *blandus* and *cardinalis* groups, and was for a long time an important one in the

garden. The corms should be planted in the fall, since the variety does not flower well if planted in the spring. It is not hardy, and can be brought safely through the winter only by planting in well-drained soil and protecting with a heavy mulch, or by planting in a cold frame.

G. rigidus is a hybrid between *G. tristis* and *G. blandus*, but inclining toward the latter. It was raised by Dean Herbert.

G. schwartzenbergianus is a hybrid with the same ancestry as *G. gandavensis*, and was listed by Jacob Makoy in 1842.

G. splendidus is another hybrid with the same parentage as *G. gandavensis*, offered by Jacob Makoy in 1842.

G. spofforthianus is a hybrid between *G. cardinalis* and *G. blandus*, raised by Dean Herbert. The flowers show more resemblance to *G. blandus* than to *G. cardinalis*. The name was given to honor Spofforth, the home of its originator.

G. Sternii is a hybrid raised by Beddinghaus and introduced by Jacob Makoy in 1842.

G. turicensis is a hybrid between *G. Saundersii* and *G. gandavensis*, offered by M. Froebel, of Zurich, Switzerland, in 1889. This hybrid was cataloged in the United States by Peter Henderson in 1891.

G. Victorialis is a hybrid between *G. byzantinus* and *G. cardinalis*. It originated with Dammann, who offered it in 1893 with the following description:

> A new early-flowering class of gladioli standing the winter well. It is the first hybrid gladiolus between a European and a Cape species. The habit of the plant stands between those of its parents. It is dwarf, robust, and rich flowering. The flowers are pink or dark red, and the inner segments are striped like those of the African *Gladiolus cardinalis*. They appear about the middle of April, are large, very open, and somewhat scented. The *Gladiolus Victorialis* offers quite a new field to the grower as he may further try to unite the beauty of the African species and the hardiness of the European kinds. Well adapted for the market and cutting.

G. vitriacensis is a hybrid between one of the *Lemoinei* varieties and some of the early-flowering forms known as *G. nanus*. The flowers are reported as being of medium size and brick red in color, with the characteristic blotches of the dwarf type. The plant, however, is taller and more vigorous than the dwarf type. This form was offered in 1913 by Cayeux et Le Clerc, who have seedlings of other colors ready for introduction. The value of this type is that it fills the gap between the early- and late-flowering groups.

G. Willmoreanus is a hybrid of *G. gandavensis* and *G. floribundus*. The flower is creamy white, with the three upper segments streaked delicate rosy purple. It resembles *G. psittacinus* in form, but not in color. The variety was introduced as *G. natalensis* var. *Willmoreanus*. Allied to this were the following varieties: *G. oldfordiensis*—flowers large, delicate

salmon marked with purple; *G. roseo-purpureus*—flowers of medium size, of a deep rosy red marked with deep purple-red; Wellington—flowers large, deep orange-red. All these were raised by Mr. Cole, gardener to Mr. Willmore, of Oldford, and were noted in the *Floricultural Cabinet* for 1850, page 295.

HISTORY OF GLADIOLUS IN AMERICA

The gladiolus was not an important garden flower in America one hundred years ago, and in comparison with other flowers it received scant treatment in the garden books of the period. McMahon (1806) mentions "gladioluses," or "gladiolus's," incidentally in his brief discussion of the culture of hardy bulbs, and likewise in connection with Cape and greenhouse bulbs. A list of species with the common name of each, taken from English garden works, is given at the end of his book. As will be seen later, these species were not cataloged in this country. Green (1828) does not mention gladioli. Sayers (1838) names the following species:

Tender bulbous plants

Gladiolus versicolor	Variegated	May, June
G. cardinalis	Dark red	May, July
G. psittacinus	Yellow	

Florists' flowers

Gladiolus alatus, bright orange
G. byzantium, delicate purple
G. carneus, flesh-colored
G. cardinalis, superb scarlet
G. floribunda
G. fragrans recurvus
G. hirsutus roseo
G. psittacina (parrot-like)

A few years later the works of Breck (1851), Bridgeman (1847), and others gave more space to the culture of gladioli, but it was not until the time of the Civil War that there seems to have been any considerable interest in the flower.

The most extensive collection of gladioli offered by any of the pioneer American seedsmen was that of William Prince, who in 1825 offered the following species and varieties:

Gladiolus (Corn flag, or sword lily)
Class, *Triandria*; Order, *Monogynia*

1. *Gladiolus communis*, purple
2. *Gladiolus communis*, rose-colored
3. *Gladiolus communis*, large red
4. *Gladiolus communis*, flesh-colored
5. *Gladiolus byzantinus*, or Turkish flag
6. *Gladiolus segetum*
7. *Gladiolus Watsonius*, or scarlet flag
8. *Gladiolus tyger*, yellow
9. Gladiolus, large African

Under *Greenhouse Plants* the following are given:

735. Rose-colored gladiolus, *G. africanus roseo*
736. Yellow gladiolus, *G. africanus luteo*
737. Narrow-leaved red gladiolus, *G. angustifolia rubro*
738. Two-spotted gladiolus, *G. bimaculatus*
739. Sad-flowering gladiolus, *G. triste*

The first species was offered at 12 cents for each bulb, the next three kinds at 20 cents, the fifth kind at 25 cents, the sixth at 50 cents, and all the others at $1 each.

The oldest American catalog consulted in this work was that of Grant Thorburn for 1824. Here are offered "Gladiolus, or Sword Lily, beautiful," at 12 cents, and "Gladiolus by name, superb varieties," at 50 cents each. Thorburn offered in 1827 the following gladioli, the prices of which also are interesting:

		Each	Per dozen
alatus, or wing-flowered	Bright orange	$ .50	$5.00
byzantinus, or Turkish flag	Delicate purple	.25	2.50
carneus	Flesh-colored	.50	5.00
cardinalis, or large-flowered	Superb scarlet	.50	3.00
floribundus, or cluster-flowered		.50	5.00
fragrans recurvus, or sweet-scented		.50	5.00
frimiculata		.50	5.00
hirsutis roseo, or rose-colored		.50	5.00

The catalog of Thorburn for 1832 includes *psittacina* (parrot-like), a new and splendid variety sold at 75 cents each or $6 a dozen. *Frimiculata* was dropped. Aside from these two changes the list is similar to the preceding.

Landreth in 1828 cataloged *G. undulatus* and *G. carneus*.

The editor of *American Gardeners' Magazine* stated in 1835 that *G. byzantinus*, *G. cardinalis*, and *G. communis* were the only kinds observed in the gardens around Boston. In the same year S. Sweetser read a paper at the January meeting of the Massachusetts Horticultural Society, entitled *Remarks on the Management of Gladiolus natalensis* (now properly known as *G. psittacinus*). He had flowered the species the year before from bulbs procured from Thorburn, who imported the species in 1832 and offered it to his customers. Later (in 1835) it was stated that *G. Colvillei* and *G. tristis* were flowered by Mr. Cushing. Baron von Ludwig sent a collection of bulbs to the Massachusetts Horticultural Society in 1836, and among them were *G. hirsutus*, *G. blandus*, and *G. alatus*. Marshall P. Wilder flowered and exhibited *G. floribundus* and *G. pudibundus* (a hybrid raised by Dean Herbert) in 1837.

Hovey & Co. in 1839 offered corms of *G. natalensis* at 20 cents each, and of *G. floribundus* at 50 cents each.

R. Buist in 1844-45 cataloged the species *bimaculatus*, *blandus*, *byzantinus*, *cardinalis*, *Colvillei*, *floribundus*, *formosissimus*, *galeatus*, *hirsutus*,

inflatus, *insignis*, *praecox*, *psittacinus*, *pudibundus*, *ramosus*, *roseus*, and *undulatus*, and the variety Queen Victoria. *G. ramosus*, *G. insignis*, and *G. formosissimus* were $2 each, while Queen Victoria corms were $2.50 each.

The editor of the *Magazine of Horticulture* says (on page 6 of volume for 1846) that the variety Queen Victoria, and the species *G. gandavensis* and *G. ramosus*, have already flowered in this country. *G. Christianus* was exhibited on July 18 of the same year, and *G. belviderus* on August 1. *G. Wilhelmus* and the variety Lizette were exhibited on June 26, 1847, and *G. Liebnitzii* was exhibited on July 24.

The culture of gladioli, however, was not very common at this time. An amateur florist wrote as follows (Anonymous reference, 1848 a):

> The Gladiolus.— This is one of the finest bulbs in the world for the open border in this country. The common Gladiolus, or "sword lily," (*G. communis*,) with purple flowers, and the green striped, or Parrot Gladiolus, (*G. psittacina*,) are well known hardy border flowers. But the finer new hybrid species and varieties, so well known in Belgium, (where they cultivate above forty sorts,) are very seldom seen in the United States, except in the gardens of the largest collectors.
>
> They are well worthy of more attention. The roots of these new sorts are very easily preserved through the winter in a cellar or green-house; and nothing can well be more gay, brilliant, or delicate than the colours of many of the finer sorts,— *G. cardinalis*, *gandavensis*, *roseus*, etc., with all the shades of flesh colour, rose, pink, deep scarlet, and purple, in their long spikes of blossoms. They also come into bloom at midsummer, when there are comparatively few flowers in our borders. Good, rich, sandy loam, and an open exposure, will, in this climate, grow them to our great satisfaction.

Hovey in 1852 listed the following species and varieties under the head *Greenhouse Bulbs*: *blandus*, *cardinalis*, *Colvillei*, *floribundus*, *gandavensis*, Lord John Russell, *natalensis*, Prince Albert, *pudibundus*, Queen Victoria, *ramosus*. In 1854 the following were added: Apollon, Eugénie, Intermedius, *psittacinus major*, *rosea carnea*, Ulysses.

From the foregoing it is evident that many, if not all, of the new kinds appearing in Europe were offered to American growers. That the importations were made is sufficient indication of an interest in gladioli, but up to 1852 the writer has not discovered any record of new varieties being produced in America.

E. S. Rand, jr., as chairman of the floral committee of the Massachusetts Horticultural Society, published with his report for 1858 a paper on the culture of the gladiolus, in which he expressed the hope that seedlings would be raised. It appears later that Mr. Rand and others acted upon the suggestion, for the following statement is found in the history of the above-named society: "This year [1863] witnessed the commencement of those profuse and beautiful displays of *seedling* gladioli." Mr. Rand exhibited in 1863 seedling no. 12, rosy salmon, which was commented upon favorably by the committee. A week later, on September 5, he

exhibited no. 2, white, a fine hybrid between Sulphuria and Berthe Rabourdin. On September 12 he exhibited seedling no. 13, light salmon in color. John Hogan exhibited five seedlings on August 22, and James McTear nine on August 29 and one on September 12.

W. C. Strong, E. S. Rand, jr., George Craft, Francis Parkman, and James McTear were the principal exhibitors of seedlings in 1864. Craft won the silver and bronze medals. Elnora (Craft), the variety awarded the silver medal, was a pure white, in some cases faintly flaked with violet, the center petal feathered maroon on delicate lemon ground; it was characterized by a bold spike, a large flower, a neat and compact face, and vigorous habit. Colonel Wilder Wright (Craft), the variety awarded the bronze medal, was of the reverse-flowered form, carnation in color, marbled and mottled with carmine, the lower petals heavily marked and feathered with carmine-purple; its size, form, and habit were good. McTear exhibited Jeanie Dean, which was white marked with crimson-purple; other varieties from the same exhibitor were Salmonia and Exemplar. Strong was awarded a first class certificate for a variety which was brilliant cherry-carmine in color, shaded violet-purple, the lower divisions of the petals marked with a distinct white line. The report for 1864 would indicate that there must have been a remarkable interest in the production of new varieties, for McTear exhibited twelve, Parkman twenty, Craft thirty-eight, and Strong forty-two seedlings during that season.

James McTear won the silver medal for the best seedling exhibited in 1865. George Craft exhibited, among other seedlings, the varieties Mrs. Westcott, Elnora, and Fairy. W. C. Strong exhibited his new seedling Parkmanii.

Silver medals were awarded to George Craft and J. S. Richards in 1867; to J. S. Richards for his seedling The Bride, and to Francis Parkman, in 1868; to J. S. Richards in 1869; to J. S. Richards for Elegantissima in 1871; to A. McLaren in 1872; and to James Comley in 1874. Bronze medals were awarded to J. S. Richards in 1872, and to W. H. Spooner for Diamond in 1878. First class certificates were awarded to Francis Parkman in 1866; to J. S. Richards for the seedling named Joseph Breck in 1868; to J. S. Richards for the seedling M. P. Wilder, and to George Craft for the seedling Thomas Sheren, in 1869; to A. McLaren in 1872; to J. C. F. Hyde in 1875; and to J. W. Clark in 1882.

The development attained by these American growers may be understood by the following extract from the report of the floral committee for 1872: "The gladioli were all that could be expected, and nothing seemed to please the strangers so much. Indeed they were astonished when informed that they were American seedlings. Gentlemen capable

of judging on any flower were delighted to know that such progress had been made in the standard of this popular and useful flower."

The credit for introducing the first American seedling has not been definitely determined, owing to the fact that all available catalog files were incomplete. It is quite certain that some of the producers of the new seedlings that have been named were the first to introduce their novelties. In the fifteenth edition (1868–69) of the catalog of Curtis & Cobb, of Boston, Massachusetts, Craft's Elnora, Finette, Imprimis, Lieutenant Stearns, and Viola, and McTear's Salmonia, are fully described.

The bound catalogs of Washburn & Co. for 1868 contain what is probably the first color plate of any variety of gladiolus published by an American seedsman. The varieties figured are *G. brenchleyensis* and Berthe Rabourdin. The first American variety shown by a color plate, so far as the writer can discover, was Innocence, a variety originated by James Vick and figured in his magazine for February, 1885. The two original varieties of *G. Lemoinei* were shown by means of an excellent color plate in *American Gardening* in 1882.

Although Curtis & Cobb appear to have been the first to catalog named American seedlings, nevertheless attention should be given to the *List of Gladiolus Roots*, No. XV, 1870, of George Craft, of Brookline, Massachusetts, wherein are described Blythe, Freedman, Gordianus, Grenadier, Jores Morthen Jongman, Lisette, Napoleon I, Theophila, Hesba, Yosemite, Finette, Katarina, Lieutenant Stearns, Lucilla, Mariana, Morningside, Petit Bonnet, Rosalind, Sarah P. Pearce, Scrooby, Statuiskii, Una, and Violenta. It is stated that these are Craft's own seedlings. It is more than probable, therefore, that Craft offered his seedlings prior to the time when the same varieties were offered by Curtis & Cobb. In 1871 Craft offered Alphonso, Ariadne, Leyden, Lucio, Mrs. Westcott, Naseby, Thomas Sheren, Valentine, and Virginie as new, with the following in his general list: Adriana, Blonde, Early, Golden Lily, Orlando. No new varieties appear in the lists for 1874 and 1875, which complete the lists consulted. There was a lessened production of seedlings after 1873 until about 1890, and the present interest in gladioli dates from about 1908.

Meanwhile the interest in the French varieties of Souchet was increasing. Barnes & Washburn, Spooner & Co. (later Strong & Spooner), Henry A. Dreer, Eugene A. Baumann, George Such, and C. L. Allen had extensive collections of varieties. The last named, in his catalog of spring bulbs for 1869, stated that he had over two hundred varieties, and in 1871 he announced over three hundred varieties. He was at that time the largest grower of corms. In 1870 he had seven acres, and in 1873 fifteen acres, devoted to growing gladioli. The cut blooms were

shipped to New York in large quantities, occasionally as many as ten thousand spikes being sent in one day.

A number of seedlings were raised at Rochester, New York, and introduced in 1883 by James Vick. These were Brunette, Bryant, Charlotte Cushman, David Copperfield, Dr. Warder, Henry Clay, Holmes, Innocence, Longfellow, Lowell, and Rainbow. This list, with the exception of the last-named variety, was cataloged for several years.

The variety Snow White was raised by J. C. F. Hyde, of Newton, Massachusetts, and exhibited before the Massachusetts Horticultural Society in August, 1879, when it was awarded a first class certificate. In 1881 it was recommended by the floral committee for the prospective prize of $40 as the best flowering plant. Hallock & Son bought the stock in 1883 and changed the name from Hyde's Seedling — or Hyde's White, as it was locally known — to Snow White, and introduced it in 1890.

Among the American varieties of gladioli produced between 1880 and 1890 were Bayard Taylor, Emma Thursby, E. M. Stanton, General Phil Sheridan, Golden, Isaac Buchanan, Joseph's Coat, Martha Washington, President Lincoln, and Augusta (Hallock).

Meanwhile Luther Burbank had been breeding gladioli, and about 1890, after twelve years of experimenting, he placed on the market a strain the flowers of which had greater substance, and therefore withstood the bright sun and dry atmosphere of California much better, than the older types. This strain had strong, stiff stems which were not so tall as in the usual types, but the flowers were large and had all the usual colors. Among the varieties were California, Cisco, Mariposa, Santa Rosa, Shasta, and Yolo. Later, probably in the following year, Igo, Modesto, Mono, and Pohono were added to the list. The price of California and Santa Rosa was $2 a corm, but the set of ten varieties was offered at $8. Unnamed seedlings and seed were offered for sale. The variety California was remarkable from the fact that the flowers were arranged close together all around the stem. The development of a number of similar varieties in France may possibly have started from this singular variety developed by Burbank. The variety California was notable also in another respect, and that was its habit of sometimes producing double flowers. If this tendency appeared when the variety was grown outside of California it does not seem to have impressed lovers of the flower, for nothing resulted from it.

The work of Matthew Crawford began about 1880, but he did not catalog gladioli until 1888. Prior to 1891 he offered his gladioli in mixtures. The first seedlings which he named and introduced were Bertha, Lulu, Mabel, and May, in 1891. In the subsequent years he offered

only mixed gladioli until 1895, when he again offered the varieties named. Unnamed seedlings one and two years old, raised from English-, French-, German-, and American-grown seed, were offered in 1891, and no doubt many of the later introductions of other growers came from this or similar sources. Isabel, Jessie, Margaret, and New America are some of Crawford's more recent varieties.

Then came the introduction of the *Childsii* varieties, remarkable for their vigor of growth and large flowers. These have had an important part in the development of American gladioli and in the increase of the flower in popular favor.

Any account of the development of American gladioli would be incomplete without mention of the work of H. H. Groff, of Simcoe, Ontario. His work was begun prior to 1890, and for years he has been breeding to eliminate the weakness of existing types. Using the strongest parents, and particularly those of individual merit (and he is unexcelled in his knowledge of varieties), he has practiced a rigid selection among his seedlings. The result is that the name Groff's Hybrids, as applied to his own named varieties, has become a synonym of merit. Through cooperation with Arthur Cowee, whose ability as a grower and exhibitor equals that of Mr. Groff as a breeder, these hybrids have become widely and thoroughly known.

The popularity of gladioli as garden flowers is due to Mr. Cowee in larger degree than to any other person. He has labored for many years to bring the merits of the flower to the attention of the people. The splendid exhibits he has made at expositions and fairs, his attractive advertising in magazines and in his catalogs, and more than all his personal enthusiasm, have served to place gladioli in the foremost rank among the garden flowers of the United States. Without the interest of the people many of the present growers would not find a market for their bulbs. All the growers, and garden lovers generally, owe much to the pioneer efforts of the gardeners of Boston, and to Childs, Crawford, Cowee, and Groff.

The ruffled gladioli produced by A. E. Kunderd, of Goshen, Indiana, are a distinctly new and original American type. The flowers are distinguished by the peculiar ruffling or fluting of the petals, producing an artistic effect approaching that seen in waved sweet peas. The first variety introduced was Kunderdi Glory. The ruffled gladioli are the result of experiments, begun about 1896, in crossing and selection of plants showing the ruffled tendency.

American growers do not depend on the novelties sent out by foreign firms, for they have produced numerous varieties better suited to this soil and climate. A study of these varieties often reveals the fact that

they are not clearly of any particular type of gladioli, and they are referred to as *American*, by which is meant that they have been produced here and are the result of so much intercrossing of previous forms that they stand alone. As has been done with the carnation, the gladiolus growers are making a new and distinctly American type of plant and flower. Through the breaking of Old World fetters and limitations the way is open to further achievement, for which the future holds bright prospects for American gladiolus breeders.

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angustus Linn.
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cuspidatus Jacq.
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cuspidatus var. *ventricosus* Lam.
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debilis Ker
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Gladiolus (*continued*):
floribundus Jacq. (*continued*):
Ker, Curtis's Bot. mag. **17**, tab. 610. 1802.
La Belgique horticole, 1859, plate 23.
gandavensis
Paxton, Mag. bot. **11**:27. 1844.
Van Houtte, Flore des serres **2**, tab. 1. 1846.
Van Houtte, Revue horticole **18**:141–142. 1846.
gandavensis var. *citrinus* (Lemonier)
Van Houtte, Flore des serres **5**, tab. 539. 1849.
gandavensis var. *superba*
Paxton, Mag. bot. **13**:190. 1847.
gracilis Jacq.
Jacquin, Icones plant. rar., tab. 246.
Ker, Curtis's Bot. mag. **16**, tab. 562. 1802.
Marloth, Flora South Africa **4**:153, tab. 46. 1915.
Redoute, Les liliacées, tab. 425.
grandis Thunb.
Andrews, Bot. repos., tab. 19 under title *G. versicolor*.
Ker, Curtis's Bot. mag., tab. 1042 under title *G. versicolor*.
Marloth, Flora South Africa **4**:157, tab. 48. 1915.
hirsutus Jacq.
Andrews, Bot. repos., tab. 11 under title *G. roseus*.
Herbier générale de l'amateur **2**, tab. 127 under title *G. hirsutus var. roseus*. 1817.
Jacquin, Icones plant. rar., tab. 250.
Ker, Curtis's Bot. mag. **16**, tab. 574 under title *G. hirsutus var. roseus*. 1802.
Redoute, Les liliacées, tab. 273.
hyalinus Jacq.
Jacquin, Icones plant rar., tab. 242 under title *G. strictus*.
illyricus Koch
Babington, Seemann's Journ. bot. **1**, tab. 4. 1863.
Reichenbach, Icones florae germ. et helv. **9**, tab. 352.
Schlechtendal, Flora von Deutschland **4**:65, tab. 309. 1880.
Sowerby and Smith, English botany **9**, tab. 1493. 1842.
imbricatus Linn.
Reichenbach, Icones florae germ. et. helv. **9**, tab. 350.
Reichenbach, Icon. bot. seu plant. crit., tab. 599.
Schlechtendal, Flora von Deutschland **4**:66, tab. 310. 1880.
Kotschyanus Boiss.
Baker, Curtis's Bot. mag. **112**, tab. 6897. 1886.
Ludwigii var. *calvatus* Baker
Baker, Curtis's Bot. mag. **103**, tab. 6291 under title *G. ochroleucus*. 1877.
Mackinderi Hook.
Hooker, J. D., Curtis's Bot. mag. **128**, tab. 7860. 1902.
maculatus Sweet
Marloth, Flora South Africa **4**:158, tab. 48. 1915.
Masoniorum Baker
Wright, Curtis's Bot. mag. **140**, tab. 8548. 1914.
Melleri Baker
Wright, Curtis's Bot. mag. **141**, tab. 8626. 1915.
Milleri Ker
Ker, Curtis's Bot. mag. **17**, tab. 632. 1803.
montanus Linn.
Loddiges, Bot. cab. **11**, tab. 1022 under title *Antholyza montana*. 1825.
niveni Baker
Andrews, Bot. repos., tab. 275 under title *G. ringens var. undulatus*.
oppositiflorus Herb.
Baker, Curtis's Bot. mag. **119**, tab. 7292. 1893.
Watson (?), Garden **45**:440–441. 1894.
orchidiflorus Andr.
Andrews, Bot. repos., tab. 241.
Jacquin, Icones plant. rar., tab. 259 under title *G. alatus*.
Ker, Curtis's Bot. mag. **18**, tab. 688 under title *G. viperatus*. 1803.
Sweet, Brit. flow. gard., ser. 1, tab. 156 under title *G. viperatus*. 1826–27.

Gladiolus (*continued*):

palustris Gaud.
Reichenbach, Icones florae germ. et helv. **9**, tab. 351.
Schlechtendal, Flora von Deutschland **4**:62, tab. 307. 1880.

papilio Hook.
Hooker, J. D., Curtis's Bot. mag. **92**, tab. 5565. 1866.

psittacinus Hook.
Hooker, W. J., Curtis's Bot. mag. **57**, tab. 3032. 1830.
Lindley, Bot. reg. **17**, tab. 1442. 1831.
Loddiges, Bot. cab., tab. 1756 under title *G. natalensis*.
Reichenbach, Exot., tab. 116.
Sweet, Brit. flow. gard., ser. 2, tab. 281. 1835.

psittacinus var. *Cooperi* Baker
Baker, Curtis's Bot. mag. **101**, tab. 6202. 1875.

purpureo-auratus Hook. f.
Hooker, J. D., Curtis's Bot. mag. **98**, tab. 5944. 1872.
Van Houtte, Flore des serres **19**, tab. 1992. 1873.

Quartinianus A. Rich.
Baker, Curtis's Bot. mag. **110**, tab. 6739. 1884.

recurvus Linn.
Andrews, Bot. repos., tabs. 27 and 227 under title *G. ringens*.
Jacquin, Icones plant. rar., tab. 247 under title *G. punctatus*.
Ker, Curtis's Bot. mag. **16**, tab. 578. 1802.
La Belgique horticole, 1859, plate 23 under title *G. ringens Andr.*
Marloth, Flora South Africa **4**:156, tab. 47. 1915.
Redoute, Les liliacées, tab. 123 under title *G. ringens*.
Van Houtte, Flore des serres **4**, tab. 422. 1848.

Saundersii Hook. f.
Hooker, J. D., Curtis's Bot. mag. **96**, tab. 5873. 1870.
Saunders, Garden **12**:64. 1877.

segetum Ker
Hallier, Deutschlands Flora, tab. 386. 1873–75.
Ker, Curtis's Bot. mag. **19**, tab. 719. 1804.
Reichenbach, Icones florae germ. et helv. **9**, tab. 353.
Reichenbach, Icon. bot. seu plant. crit., tab. 600.
Schlechtendal, Flora von Deutschland **4**:67, tab. 353. 1880.

sericeo-villosus Hook.
Hooker, W. J., Curtis's Bot. mag. **90**, tab. 5427. 1864.

spathaceus Pappe
Marloth, Flora South Africa **4**:158, tab. 48. 1915.

striatus Jacq.
Jacquin, Icones plant. rar., tab. 260.

sulphureus De Graaf
Hooker, J. D., Curtis's Bot. mag. **127**, tab. 7791. 1901.
Molkenboer, Jaarboek Tuinbouw, 1850, p. 39.

tenellus Jacq.
Jacquin, Icones plant. rar., tab. 248.
Marloth, Flora South Africa **4**:157, tab. 48. 1915.

trichonemifolius Ker
Ker, Curtis's Bot. mag. **36**, tab. 1483. 1812.

tristis Linn.
Curtis, Bot. mag. **8**, tab. 272. 1794.
Ehret and Trew, Plantae selectae, 1750–1773, tab. 39 under title *G. bifolius et biflorus, folius quadrangularis*.
Jacquin, Icones plant. rar., tab. 243.
Ker, Curtis's Bot. mag., tab. 1098.
Redoute, Les liliacées, tab. 35 under title *G. spiralis*.

tristis var. *concolor* Salisb.
Jacquin, Icones plant. rar., tab. 245 under title *G. tristis*.
Marloth, Flora South Africa **4**, tab. 46. 1915.
Salisbury, Paradisus Londinensis, tab. 8.

Gladiolus (*continued*):
undulatus Jacq.
Jacquin, Icones plant. rar., tab. 251.
Ker, Curtis's Bot. mag. **18**, tab. 647. 1803.
Redoute, Les liliacées, tab. 122.
villosus Ker
Ker, Curtis's Bot. mag. **21**, tab. 823 under title *G. hirsutus var.* 1805.
vittatus Hornem.
Ker, Curtis's Bot. mag. **15**, tab. 538 under title *G. undulatus.* 1801.
Schneevoogt, Icones plant. rar., tab. 19 under title *G. angustus.*
vomerculus Ker
Ker, Curtis's Bot. mag. **38**, tab. 1564 under title *G. hastatus.* 1813.

HYBRID GLADIOLI

Gladiolus:
antwerpiensis
Flor. cab. **10**:265. 1842.
Christianus
Revue hort. **23**:341. 1851.
Colvillei
Maund, Bot. gard. **5**:4, tab. 167, fig. 5.
Mrs. Loudon, Ladies' flow. gard., Bulbs, tab. 13, fig. 5, p. 61. 1841.
Sweet, Brit. flow. gard., ser. 1, tab. 155. 1826–27.
Van Houtte, Flore des serres **19**, tab. 1993. 1873.
Colvillei albus
Pucci, Bul. Roy. Soc. Toscana Ort. **23**, tab. 7. 1898.
Van Houtte, Flore des serres **19**, tab. 1993.
Delbarinus (Delbaere)
Ann. Soc. Roy. Hort. Gand **3**, tab. 158. 1847.
hybridus Lemoine
Amer. gard. n. s. (**1**:5). 1882.
Garden **17**:306. 1880.
ignescens
Maund, Bot. gard. **6**:136, tab. 233, fig. 2.
insignis
Paxton, Mag. bot. **7**:223. 1840.
Lemoinei
Amer. gard. n. s. **1**:5. 1882.
Revue hort. **51**:330. 1879.
Leopoldii (Carolus)
Ann. Soc. Roy. Hort. Gand **4**, tab. 194. 1848.
mitchamiensis
Herbert, Trans. Hort. Soc. London **4**, tab. 2 under title *G. tristi-hirsutus.*
oldfordiensis (Cole)
Moore, Gard. mag. bot., hort., and flor., 1850, p. 249.
picta blandas (Plant)
Flor. cab. **6**:264. 1838.
primulinus hybrids
Garden **76**:391. 1912.
Garnier, Revue hort. **82**:578–579. 1910.
princeps (Van Fleet)
Revue hort. **76**:208–209. 1904.
pudibundus (Herbert)
Paxton, Mag. bot. **2**:197. 1836.
Sweet, Brit. flow. gard., ser. 2, tab. 176. 1833.
Quartinianus superbus
Garden **55**:388–389. 1899.
ramosus
Flor. cab. **7**:143. 1839.
Maund, Bot. gard. **6**:165, tab. 238, fig. 2.
Mrs. Loudon, Ladies' flow. gard., Bulbs, tab. 12, fig. 1.
Paxton, Mag. bot. **6**:99. 1839.

Gladiolus (*continued*):
rigidus (Herbert)
Herbert, Trans. Hort. Soc. London **4**, tab. 2 under title *G. tristi-blandus.*
ringente-tristis (Herbert)
Herbert, Trans. Hort. Soc. London **4**, tab. 2.
roseo-purpureus
Flor. cab. **19**:6. 1851.
Moore, Gard. mag. bot., hort., and flor., 1850, p. 249.
Willmoreanus (Cole)
Moore, Gard. mag. bot., hort., and flor., 1850, p. 169.
Van Houtte, Flore des serres **6**, tab. 639.

HORTICULTURAL VARIETIES

Ad. Brongniart (Souchet)
Floral mag. **6**, tab. 363. 1867.
Aida (Haage & Schmidt)
Deut. Mag. Gart. u. Samenkunde, 1878, p. 371.
Alice Wilson (Standish)
Flor. and pomol., 1873, p. 73.
Alphonse Lavallee
L'hort. franç., 1856, tab. 20.
Alsace
Revue hort. Belge **13**:227, tab. 23. 1887.
Alsace-Lorraine (Lemoine), *nanceianus* var.
Jardin, 1902, p. 216.
Prakt. Ratgeber Obst u. Gartenbau **19**:360. 1904.
Aristote
Illus. hort. **4**, tab. 154, fig. 4. 1857.
Arlequin (Souchet)
Flore des serres **12**, tab. 1246. 1857.
Illus. hort. **4**, tab. 154, fig. 8. 1857.
Atroroseus
Florists' journ. **3**:177. 1842.
Bala (Kelway 1911)
Garden **76**:437. 1912.
Baron Joseph Hulot (Lemoine 1896), *Lemoinei* var.
Revue hort. **71**:404. 1899.
Beatrice
Garden **17**:156. 1880.
Ben Hur (Childs), *Childsii* var.
Garden **48**:420. 1895.
Bernard de Rennes (Truffaut)
Revue hort. **23**:341.
Berthe Rabourdin
Flor. fruit and gard. misc., 1859, p. 97.
Illus. hort. **4**, tab. 154, fig. 5. 1857.
Blushing Bride
Garden **34**:580. 1888.
Revue hort. **71**:111, fig. 4. 1899.
Boussingault (Lemoine 1887)
Revue hort. **50**:228. 1888.
Bramfarine (E. Aragon)
Revue hort. **39**:131–132. 1867.
Calypso
Illus. hort. **6**, 227, fig. 5. 1859.
Illus. Gart. Ztg., 1860, p. 128.
Canari
Illus. hort. **6**, tab. 227, fig. 1. 1859.
Illus. Gart. Ztg., 1860, p. 128.
Charles Davis (Standish)
Flor. mag. **3**, tab. 171. 1863.

Charles McIntosh
Revue hort. **71**:111, fig. 5. 1899.
Christophe Longueil (Dr. d'Avoine)
Ann. Soc. Roy. Hort. Gand, 1849, tab. 239.
Cochenille (Verdier père)
L'hort. franç., 1851, tab. 23.
Comte de Kerchove (Lemoine 1896), *Lemoinei* var.
Revue hort. Belge **23**:217.
Countess Coghen
Ann. Soc. Roy. Hort. Gand **3**:51. 1847.
Countess Craven (Kelway)
Flor. mag. **20**:465–466. 1881.
Couranti carneus (Thibaut et Keteleer)
L'hort. franç., 1852, tab. 15–16.
Crepuscule (Lemoine 1899)
Prakt. Ratgeber Obst u. Gartenbau **19**:360. 1904.
Dame Blanche (Haage & Schmidt)
Revue hort. **68**:540. 1896.
Demi-deuil (Lemoine 1899), *Lemoinei* var.
Jardin, 1902, p. 216.
Diane
Illus. hort. **6**, tab. 227, fig. 8. 1859.
Illus. Gart. Ztg., 1860, p. 128.
Docteur Spae (Truffaut)
L'hort. franç., 1851, tab. 19, fig. 2.
Duc de Malakoff
Illus. hort. **6**, tab. 227, fig. 3. 1859.
Illlus. Gart. Ztg., 1860, p. 128.
Ed. Pynaert-Van Geert (Lemoine)
Revue hort. Belge **18**, tab. 19–20, fig. 5. 1892.
Eleanor Norman
Flor. mag. **4**, tab. 222. 1864.
Elvira
Revue hort. **71**:111, fig. 7. 1899.
Emile Galle (Lemoine 1887)
Revue hort. **63**:568. 1891.
Emperor Napoleon [=Marechal Vaillant] (Leveau, Loise 1866)
Revue hort. **38**:8–9, fig. 2. 1866.
Ethiope (Lemoine 1898), *Lemoinei* var.
Revue hort. **71**:404. 1899.
Eugénie Bourdier (Truffaut)
Flore des serres **7**, tab. 697, fig. 1. 1851–52.
E. V. Hallock (Lemoine), *Lemoinei* var.
Illus. hort. **37**:107, tab. 115, fig. 3. 1890.
Ferdinand de Lesseps (Lemoine)
Revue hort. **63**:568. 1891.
Ferdinand Kegeljan (Lemoine), *nanceianus* var.
Jardin, 1900, p. 348.
Fille de l'Air (Lemoine 1897), *nanceianus* var.
Revue hort. **71**:404. 1899.
Flaming Sword (Kelway 1911)
Garden **76**:182, tab. 1449. 1912.
Garden **76**:437.
Francis Herincq
L'hort. franç., 1853, tab. 20.
Gen. Changarnier (Truffaut)
Flore des serres **7**, tab. 697, fig. 3. 1851–52.
General Grant
Revue hort. **71**:111, fig. 6. 1899.
General Scott
Garden **34**:580, fig. 3. 1888.
Georges Frick (Lemoine), *nanceianus* var.
Jardin, 1900, p. 348.

Georges van Rye (Dr. d'Avoine)
Ann. Soc. Roy. Hort. Gand, 1849, tab. 239.
Goethe (Haage & Schmidt)
Deut. Mag. Gart. u. Samenkunde, 1878, p. 371–378.
Goliath (Souchet)
Illus. hort. **4**, tab. 154, fig. 1. 1857.
Harry Veitch (Lemoine 1890), *nanceianus* var.
Garden **41**:190. 1892.
Henri Vautier (Lemoine 1898), *nanceianus* var.
Revue hort. **71**:404. 1899.
Henry Irving
Revue hort. **71**:111, fig. 2. 1899.
Horace (Souchet 1869)
Flor. mag. **9**, tab. 507–508. 1870.
Imperatrice Eugénie (Souchet)
Illus. hort. **14**, tab. 504, fig. 1. 1867.
Innocence (Vick 1883)
Vick's mag., Feb. 1885.
Iris (Ragot)
Revue hort. **85**:35. 1913.
Isoline
Illus. hort. **6**, tab. 227, fig. 2. 1859.
Illus. Gart. Ztg., 1860, p. 128.
Jacob (E. Aragon)
Revue hort. **39**:131. 1867.
James William Kelway (Kelway 1911)
Garden **76**:437. 1912.
Jean Ragot (Ragot)
Revue hort. **85**:35. 1913.
John Laing (Lemoine)
Illus. hort. **37**:107, tab. 115. 1890.
John Standish (Douglas)
Flor. and pomol., 1872, p. 169.
John Standish (Standish)
Deut. Mag. Gart. u. Samenkunde, 1863, p. 353.
Flor. fruit and gard. misc., 1860, p. 231.
Flor. mag. **1**, tab. 36. 1861.
John Waterer (Souchet)
Illus. hort. **14**, tab. 504, fig. 3. 1867.
Julia (Kelway)
Flor. mag. **7**, tab. 405. 1868.
Jupiter (Souchet 1871)
Flor. mag. n. s. **11**, tab. 43. 1872.
King of Gladioli (Kelway 1905)
Garden **70**:6. 1906.
Kleber (Lemoine 1890)
Garden **41**:190. 1892.
Revue hort. Belge **18**:217, tab. 19–20, fig. 1. 1892.
Konigen Wilhelmina
Gartenflora **46**, tab. 1437.
Lady Alice Hill (Standish)
Flor. and pomol., 1868, p. 241.
Lady Muriel Digby (Kelway 1904)
Garden **76**:182, tab. 1449. 1912.
La France (Lemoine)
Garden **30**:76. 1886.
L'Alsace (Lemoine)
Garden **30**:76. 1886.
Le Chamois (Souchet)
Flore des serres **12**, tab. 1246. 1857.
Le Grand Carnot (Lemoine 1890), *nanceianus* var.
Revue hort. Belge **18**:217, tab. 19–20, fig. 6. 1892.

Leopoldii
Ann. Soc. Roy. Hort. Gand **4**:173. 1848.
Le Pactole
Revue hort. **63**:568. 1891.
Louis Van Houtte (Truffaut)
Revue hort. **60**:228. 1888.
Madame Chauviere (Truffaut)
L'hort. franç., 1851, tab. 19, fig. 1.
Madame de Vilain
Ann. Soc. Roy. Hort. Gand **3**:51. 1847.
Madame Dombrain (Souchet 1868)
Flor. mag. **8**, tabs. 463–464. 1869.
Madame Eugène Verdier
L'hort. franç., 1856, tab. 20.
Madame Ferdinand Cayeux (Lemoine 1900), *Lemoinei* var.
Jardin, 1902, p. 216.
Madame Furtado (Souchet)
Flore des serres **7**, tab. 697, fig. 4. 1851–52.
Madame Herincq (Verdier père)
L'hort. franç., 1851, tab. 23.
Madame Lemichez (Truffaut)
Flore des serres **7**, tab. 697, fig. 5. 1851–52.
Madame Leseble (Souchet)
Deut. Mag. Gart. u. Samenkunde, 1863, p. 353.
Flor. mag. **1**, tab. 36. 1861.
Madame le Vicomtesse Vilain
Ann. Soc. Roy. Hort. Gand **3**:51. 1847.
Madame Pele (Souchet)
Flore des serres **12**, tab. 1246. 1857.
Madame Rivière
L'hort. franç., 1853, tab. 20.
Madame Rougier
L'hort. franç., 1853, tab. 20.
Madame Vilmorin (Souchet)
L'hort. franç., 1864, tab. 23.
Mademoiselle Olympe Lescuyer
L'hort. franç., 1856, tab. 20.
Mademoiselle Sosthenie (Truffaut)
Revue hort. **25**:41. 1853.
Marechal Fabert (Lemoine 1899)
Jardin, 1900, p. 348.
Marie Lemoine (Lemoine), *Lemoinei* var.
Amer. gard. n. s. **1**:5. 1882.
Garden **17**:306. 1880.
Revue hort. **51**:330. 1879.
Marot
Revue hort. Belge **13**:227, tab. 23. 1887.
Marquis de Saporta (Lemoine 1886)
Revue hort. **63**:568. 1891.
Marquise de Pompadour (Leveau, Loise 1866)
Revue hort. **38**:8–9. 1866.
Masque de Fer (Lemoine)
Garden **30**:76. 1886.
Mathilda
Revue hort. **71**:111, fig. 3. 1899.
Mathilde de Landevoisin (Souchet)
Illus. hort. **6**, tab. 227, fig. 6. 1859.
Illus. Gart. Ztg., 1860, p. 128.
Milton (Souchet)
Flor. mag. **5**, tab. 315. 1865.
Mr. J. W. Lane (Standish)
Flor. mag. **3**, tab. 123. 1862.

Mrs. Bates (Kelway)
Garden **15**:240. 1879.
Mrs. Beecher (Childs 1893), *Childsii* var.
Garden **48**:420. 1895.
Mrs. Dombrain (Standish)
Flor. mag. **2**, tab. 77. 1862.
Mrs. Marshall
Flor. mag. **20**, tab. 465–466. 1881.
Mrs. Moore (Standish)
Flor. mag. **1**, tab. 36. 1861.
Mrs. Reynolds Hole (Standish)
Flor. fruit and gard. misc., 1861, p. 289.
Mrs. Standish (Standish)
Deut. Mag. Gart. u. Samenkunde, 1863, p. 353.
Flor. fruit and gard. misc., 1860, p. 321.
Mons. Ch. Henry
Revue hort. Belge **13**:227, tab. 23. 1887.
Monsieur Domage
L'hort. franç., 1853, tab. 20.
Monsieur Legouve
Flor. mag. **8**, tab. 463–464. 1869.
Monsieur Vinchon (Souchet)
Flore des serres **12**, tab. 1246. 1857.
Napoleon III (Souchet)
L'hort. franç., 1864, tab. 23.
Neogenes (Kelway)
Flor. mag. **13**, tab. 102. 1874.
Ne Plus Ultra
Garden **17**:156. 1880.
Nestor (Souchet 1870)
Flor. mag. **11** n. s., tab. 3. 1872.
Neue Bleue (Lemoine 1890), *Lemoinei* var.
Revue hort. Belge **18**:217, tab. 19–20, fig. 7. 1892.
Newton (Souchet)
Flor. mag. **6**, tab. 364. 1867.
Oberpresident von Seydenwitz
Gartenflora, tab. 1268.
Ophir (Souchet)
Illus. hort. **6**, tab. 227, fig. 7. 1859.
Illus. Gart. Ztg., 1860, p. 128.
Oracle (Souchet)
Illus. hort. **4**, tab. 154, fig. 6. 1857.
Oriflamme (Lemoine 1887)
Revue hort. **60**:228. 1888.
Orion (Haage & Schmidt)
Deut. Mag. Gart. u. Samenkunde, 1878, p. 371.
Orphee (Souchet 1869)
Flor. mag. **9**, tab. 507–508. 1870.
Our Little Lucy (Standish)
Flor. and pomol., 1866, p. 65.
Pactole (Lemoine), *Lemoinei* var.
Illus. hort., **37**:107, tab. 115, fig. 1.
Parure (Lemoine 1898), *nanceianus* var.
Jardin, 1900, p. 348.
Patens
Flor. journ. **3**:177. 1842.
Paul Marguerite (Lemoine), *Lemoinei* var.
Illus. hort. **43**:345, tab. 70. 1896.
Pegase (Souchet)
Illus. hort. **4**, tab. 154, fig. 3. 1857.
Phebus (Souchet 1871)
Flor. mag. **12** n. s., tab. 63. 1873.

President Carnot (Lemoine 1889)
Illus. hort. **37**:107, tab. 115, fig. 4. 1890.
Revue hort. Belge **18**:217, tab. 19-20, fig. 3. 1892.
Prince Imperial (Paulin)
L'hort. franç., 1862, tab. 20.
Princess Mathilde
Garden **17**:156. 1880.
Professeur Lambin (Lemoine 1891)
Revue hort. Belge **18**, tab. 19–20, fig. 2. 1892.
Queen Mary (Kelway)
Flor. mag. **17**, tab. 295. 1878.
Queen Maud (Kelway 1908)
Garden **76**:182, tab. 1449. 1912.
Queen Victoria (Plant)
Flor. cab. **6**:264. 1838.
Randle Jackson (Standish)
Flor. mag. **4**, tab. 184. 1864.
Raphael (Lemoine 1897), *nanceianus* var.
Jardin, 1902, p. 216.
Rebecca (Souchet)
Illus. hort. **4**, tab. 154, fig. 7. 1857.
Regnerus Bruitsma (Dr. d'Avoine)
Ann. Soc. Roy. Hort. Gand, 1849, tab. 239.
Reine Victoria (Souchet)
Illus. hort. **14**, tab. 504, fig. 2. 1867.
Rembertus Dodonaens (Dr. d'Avoine)
Ann. Soc. Roy. Hort. Gand, 1849, tab. 239.
Reverend W. Wilks (Lemoine)
Illus. hort. **37**:107, tab. 115, fig. 2. 1890.
Robert Lodge (Douglas)
Flor. mag. **10**, tab. 556. 1871.
Rosea Maculata
Garden **34**:580, fig. 4. 1888.
Rosy Gem
Garden **34**:580, fig. 2. 1888.
Schwaben (Pfitzer)
Revue hort. Belge **38**:377. 1912.
Sir George Nares (Kelway)
Flor. mag. **17**, tab. 296. 1878.
Sirius (Haage & Schmidt)
Deut. Mag. Gart. u. Samenkunde, 1878, p. 371.
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INDEX

SPECIES*

Acidanthera: PAGE
aequinoctialis ... 107
flexuosa ... 97, 107
platyphylla ... 108
tubulosa ... 107(2), 108, 109
Antholyza:
aethiopica ... 109
aletroides ... 108
caffra ... 109
cunonia ... 97, 107
merianella ... 108
nervosa ... 107, 108
quadrangularis ... 97, 107, 108
revoluta ... 108(2), 109
Watsonioides ... 107, 108, 109
Aristea:
capitata ... 97, 107
Babiana:
coronata ... 109
distichia ... 107, 108
mucronata ... 108
obtusifolia ... 108
plicata ... 107, 108(3), 109
rosea ... 108
secunda ... 109
spathacea ... 109
stricta ... 97, 108(4), 109(5)
sulphurea ... 108
tubata ... 108, 109
tubiflora ... 107(2), 108, 109
villosa ... 108
Ferraria:
undulata ... 108
Freesia:
refracta ... 108, 109(3)
Gladiolus:
abbreviatus ... 107
Adlami ... 101
aequinoctialis ... 107
affinis ... 103
affinis ... 104, 118
africanus ... 155(2)
alatus ... 97 (2), 101, 104, 105, 106(3), 110, **117** 125(2), **137**, 154, 155(2)
namaquensis ... 97, 105(2), 110, **117**
alatus ... 104
albidus ... 104
albus ... 128
aleppicus ... 104, 117
aletroides ... 107
algoensis ... 104
alopecuroides ... 97, 107(2)
alpigenus ... 104
amabilis ... 107
ambiguus ... 104
amoenus ... 107(2)
anceps ... 107(2)
andongensis ... 102(2), 104
Andrewsii ... 104
angolensis ... 102(2), 104
angustem ... 96
angustifolia ... 155
angustifolius ... 104, 107
angustus ... 96(2), 98, 99, 104(2), 105(2) 106(2), 110, 125(2), **137**
angustus ... 104(3), 117
antholyza ... 107
antunesii ... 103, 110
aphanophyllus ... 103, 110
aphyllus ... 98
aphyllus ... 104
arcuatus ... 101, 110
arenarius ... 101, 105, 110
Arnoldianus ... 103, 110

Gladiolus (*continued*): PAGE
arvaticus ... 103
atropurpureus ... 102, 110
atrorubens ... 103, 110
atroviolaceus ... 104, 106, 110, **117**, 121, **138**
aurantiacus ... 101, 110
aureus ... 110
Bakeri ... 103
Baumi ... 103
bellus ... 103, 110
belviderus ... 156
benguellensis ... 102, 110
bicolor ... 101, 105, 106, 110
bicolor ... 107
biflorus ... 100, 110
biflorus ... 104, 107
bimaculatus ... 97, 104, 155(2)
binervis ... 104
blandus ... 98, 101, 104, 105(5), 106(2), 110, **117** 125(2), **138**, 155(2), 156
albidus ... 104, **117**, **138**
carneus ... 104(2), **117**, **138**
excelsus ... **117**, **138**
Hibbertii ... **117**, **138**
Mortonius ... **117**, **139**
blandus ... 117(2)
niveus ... 117
Bolusii ... 100, 110
Borneti ... 104
Boucheanus ... 104
brachyandrus ... 102, 110
brachylimbus ... 103
brachyscyphus ... 100, 110
bracteatus ... 107
bracteolatus ... 107
brenchleyensis ... 130, **145**, 158
brevicaulis ... 102, 110
brevicollis ... 104
brevifolius ... 98, 99, 104(4), 105(2), 106, 110
brevispathus ... 103
Breynianus ... 98, 104, 120, 125
Buchanani ... 102, 110
Buettneri ... 102, 110
Burmanni ... 107
byzantinus ... **96**, 98, 104, 105, 110, **117**, 121, 124 125, 128, 154, 155(3)
byzantinus ... 104(2)
byzantium ... 154
calothyrsus ... 103, 110
calvatus ... 104
campanulatus ... 104, 117, 138
candicans ... **145**
candidus ... 145
capitatus ... 97, 107
cardinalis ... 98, 101, 106, 111, **118**, 125(2), **139** 154(2), 155(3), 156(2)
inflatus ... 128
subroseus ... 139
carinatus ... 97, 104, 120, 144
carmineus ... 103, 111
carnei coloris ... 124
carneus ... 104, 154, 155(2)
carneus ... 98, 104(5), 118
Carsoni ... 103
caryophyllaceus ... 107
caryophylleus ... 107
caucasicus ... 104, 121
caudatus ... 103, 111
Childsii ... 133, **145**
Christianus ... 156
citrinus ... 104
coccineus ... 107
cochleatus ... 100, 111
cochleatus ... 104

*Species names in italics are synonyms. Page numbers in bold-faced type indicate pages on which descriptions of species are given.

Gladiolus (*continued*): PAGE
coerulescens 102, 111
collinus 104
Colvillei ..... **125**, 128, **146**, 151, 155(2), 156
albus **147**, 151
Colvillioides **147**
communis ..... 96, 98, 104, 105(2), 111, **118**, 121 124, 125(3), 154(4), 155, 156
communis ..... 104(4), 121
commutatis 104
concolor 104, 144
Conrathi 103
Cooperi 104
cordatus 104
corneus 102, 111
crassifolius 100, 111
crispiflorus 104
crispus 107
crocatus 107
cruentus 101, 111, **118**, **140**
cunonia 97, 107
cuspidatus 98, 99, 104, 105, 106, 111, **118**, **141**
ensifolius 111, **118**
ventricosus ..... 98, 104(2), 107(2), 111, **118**
cuspidatus 104, 118
cyclocarpus 103
cymbarinus 103
Daeleni 143
dalmaticus 104
debilis 100, 111
decipiens 103, 111
decoratus 102, 111
deiodes 111
delicatus 147
densiflorus 103
denticulatus 107
dichotomus 104
distichus 107
dracocephalus 101, 111 **118**, **141**, 141, **147**
Dregei 101, 111
dubius ..... 104(2)
Eckloni 100, 104, 111
edulis 98, 101, 111
elatus 105, 117
elegans 103, 111
Elliotii 100, 111
Elloni 103
elongatus 98, 105, 107
ensifolius 105
equitans 105, 117
erectiflorus 100, 101, 111
excelsior **148**
excelsus 105
excisus 107
exscapus 107
Fabricii 107
falcatus 107
fasciatus 105
festivus 105
fissifolius 107
fistulosus 107
flabellifer 105, 142
Flanagani 103, 111
flavus 107
flexuosus 103, 111
flexuosus ..... 97, 107(2)
flore alba (or *albo*) **96**, 124
florentiae 111
flore rubente **96**
flore suave rubente 124
floribunda 154
floribundus ..... 98, 100, 105, 111, **118**, 125, 128 129, 155(4), 156
floribundus 105, 142
floribus uno versu dispositis ..... 124(5)
foliis ensiformibus 96
foliis linearibus 96
formosissimus **149**, 155, 156
formosus 101, 111
formosus 105
fragrans **149**
recurvus 154, 155
fragrans 107

Gladiolus (*continued*): PAGE
frimiculata ..... 155(2)
fusco-viridis 103, 111
galeatus 105, 107, 117, 155
galiciensis 105
gallacensis 103, 112
gandavensis ..... 128, 149, 156(3)
citrinus **129**
Garnieri 102, 112
Garnierii 107
garuanus 103, 111
Gawleri 103
Gawleri 105
gazensis 103, 112
germanicus 103
glaucus 103
glumaceus 107
Goetzei 103, 112
gracilis ..... 97, 99, 105, 106(3), 112
gracilis 105
gracillimus 103, 112
gramineus 107
grandiflorus 105, 118
grandis ..... 97, 99, 104, 105(2), 106, 107, 112 **119**, **142**
Grantii 102, 112
gregarius 102, 112
Gueinzii 105
Guepini 105
halophilus 112, 121
Hanningtoni 102, 112
Hanru 103
Harmsianus 103, 112
hastatus ..... 99, 104, 105, 106(2), 112
hastatus 105
haylockianus **149**
Herbertianus 149
Herbertii 128
heterolobus 103, 112
hirsutis roseo 155
hirsutus ..... 97, 100, 104(3), 105(2), 106(2), 112 **119**, 128, 155, 156
roseo 154
hirsutus 105
roseus 119
hirtus 105
hispanicus flore albo ..... 123(2)
humilis 112, 121
hyalinus 97, 100, 106, 112
hygrophilus 105
illyricus ..... 104(4), 105, 106(2), 112, 121
Reuteri ..... 106(2)
imbricatus ..... 96, 98, 104, 105(4), 106(5), 112 121, 124, 125
inandensis 99, 112
inarimensis 105, 121
incarnatus **149**
inclinatus 108
inconspicuus 103
indicus 108
infestus 105, 121
inflatus 98, 100, 101, 105, 106, 112, 156
blandus 128
infundibuliformis 108
insignis ..... 128, **150**, 156(2)
involutus 97, 98, 100, 104, 112, 125
iridifolius 108
italicus 95, 96, 105, 121
flore rubro ..... 123(2)
ixioides 108
Johnstoni 103, 112
junceus 108
junodi 103
karendensis 103
kilimandscharicus ..... 102(2), 105
Kirkii 100, 112
Kotschyanus 112, 121
kubangensis 103, 112
laccatus 105, 108
laceratus 108
lacustris 95
laevis 98, 105
Lamarckii 105

Gladiolus (*continued*): PAGE

lambda ... 99, 113
Lannesii ... 103
latifolius ... 108
laxiflorus ... 102, 113
laxus ... 108
Leichtlinii ... 101, 102, 113
Leichtlinii ... 133
Lemoinei ... **132, 150,** 158
Lemonia ... 105
leucanthus ... 105
libanoticus ... 105
Liebnitzii ... 156
liliaceus ... 105
linearifolius ... 103, 113
lineatus ... 108
littoralis ... 103
Loddigesii ... 128
lomenia ... 108
longanus ... 103
longicollis ... 108
longiflorus ... 108(4)
Lowii ... 150
lucidor ... 108
Ludoviciae ... 105, 121
Ludwigii ... 100, 113
calvatus ... 104
luridus ... 102, 113
luridus ... 105
luteolus ... 113
luteus ... 97, 98, 102, 113, 125
luteus ... 105
Mackinderi ... 103, 113
Macowani ... 101, 113
Macowaniensis ... 105
macrophlebius ... 103, 113
maculatus ... 142
maculatus ... 105, 120
major byzantinus ... 124
malangensis ... 103, 113
Marchallii ... 105
marginatus ... 108
marmoratus ... 108
Masoniorum ... 103, 113
massiliensis ... **150**
massoni ... 103
masukuensis ... 103, 113
maximus indicus ... 124
Melleri ... 102, 113
merianellus ... 98, 108
merianus ... 108
micranthus ... 102, 103, 113(2), 121
microphyllus ... 99, 113
microsiphon ... 103
Milleri ... 98, 101, 113, 125
minor ... 108
minutiflorus ... 108
mirus ... 103, 113
mitchamiensis ... **151**
mollis ... 106
monostachyus ... 105
montanus ... 97, 101, 106(2), 113, 125
morrumbalaensis ... 103
Mortonianus ... 105
Mortonius ... 105
mosambicensis ... 103
mucronatus ... 105, 108(2)
multiflorus ... 102, 113
Münzneri ... 103, 113
namaquensis ... 97, 105, 117
nanceianus ... 133, **151**
nanus ... **151**
nanus ... 108
narbonensis ... **95**(2), 105
flore incarnato ... 122, 123
flore incarnato intensiore ... 123(2)
narbonensium flore purpureo ... 122(2)
natalensis ... 105, 120, 143, 155(2), 156
neglectus ... 105
nervosus ... 108(2)
newii ... 102(2), 105
niveni ... 100, 106, 113
notarisii ... 105

Gladiolus (*continued*): PAGE

numidicus ... 103
nyikensis ... 103, 113
Oatesii ... 102, 113
ochroleucus ... 100, 113
odoratus ... 151
odorus ... 105, 108, 120
oldfordiensis ... **129, 153**
oliganthus ... 103, 113
oligophlebius ... 103, 113
oppositiflorus ... 101, 105(3), 113, 119, 129, **142**
oppositifolius ... 105
orchidiflorus ... 97, 101, 104, 107(2), 113
orchidiflorus ... 105
oreocharis ... 103, 113
ornatus ... 105
orobranche ... 105
pallidus ... 103, 113
paludosus ... 100
palustris ... 104, 105, 106(3), 121
palustris ... 95
paniculatus ... 108
papilio ... 100, 119, **120**
papilionaceus ... 106, 108, 117
Pappei ... 100, 113
parviflorus ... 113
parviflorus ... 106
parvulus ... 114
pauciflorus ... 102, 114
pauciflorus ... 106
pectinatus ... 108
permeabilis ... 97, 101, 104, 114
persicus ... 114, 121
petraeus ... 106, 117
pictus ... 106
pilosus ... 106
plantagineus ... 108
platyphyllus ... 101(2), 103, 114
plicatum ... 96
plicatus ... 97, 108(3)
polystachyus ... 108(2)
porrigeus ... 103
Pottsii ... 108
praecox ... 128, **151**, 156
praecox ... 108
pratensis ... 106
pretorius ... 103
primulinus ... 102(2), 114, **120,** 134
concolor ... 135
erectus ... 135
maculatus ... 135
major ... 135
salmoneus ... 135
primulinus ... 106, 143
princeps ... **140, 151**
prismatosiphon ... 103, 114
propinquus ... 152
psittacina ... 154, 155, 156
psittacinus ... 101, 105, 114, **120,** 128, **143,** 154, 155, 156
Cooperi ... 104, 114, **120, 143**
major ... 156
pterophyllus ... 106
puberulus ... 103, 114
pubescens ... 99, 103, 114
pudibundus ... **152,** 155, 156(2)
pulchellus ... 101, 114
punctatus ... 100, 103, 114
punctatus ... 106, 108, 120
punctulatus ... 106
puniceum ... 96
puniceus ... 97, 106, 108
purpureo-auratus ... 100, 114, **120, 143**
hybridus ... 132
purpureus ... 108
purpureus minor ... **96**
pygameus ... 108
pyramidalis ... 108(2)
quadrangularis ... 97, 108
Quartinianus ... 102(3), 104(2), 105(2), 106(5), 107, 114, **143**
quilimanensis ... 103, 114
rachidiflorus ... 99, 114

Gladiolus (*continued*): PAGE

Raddeanus 106
ramosissimus **152**
ramosus 127, 128, **152**, 156(4)
ramosus 97, 106, 108(2)
recurvus 97(2), 98, 99, 104(2), 105(2), 106(3), 107 114, **120**, 125(2), 142, **144**
recurvus 108(2)
reductus 103
reflexus 108
refractus 108
Rehmanni 100, 114
remorifolius 103
resubspinatus 109
Reuteri 106
rigescens 103
rigidifolius 103
rigidus 153
ringens 106(2), 109, 120
undulatus 106
Rogersii 100, 114
rosea carnea 156
roseo-albus 109
roseo-purpureus **129**, **154**
roseus 128, 156(2)
roseus 106, 109(2), 119
rossicus 106
rubens 109
rubrocyanus 109
rubromarginatus 106
rupicola 103, 114
ruricola 103
sagittifer 106
salicatus 128
salmoneus 100, 114
saltatorum 106
Saundersii 101, 114, **120**
scaber 105
scaphochlamys 100, 114
schimperianus 106
Schlechteri 103
schwartzenbergianus 153
Scullyi 101, 114
secundus 109
securiger 109
segetalis 106
segetum 94, 95, 98, 104(6), 105(5), 106(2), 115 **121**, 121, 124, 125, 154
sericeo-villosus 100, 115, **121**
serotinus 106(2)
setifolious 97
setifolius 106, 109
silenoides 109
sintensii 115, 121
sparmanni 109
spathaceus 100, 104, 115
spathaceus 106
spatheceus 109
spathulatus 101, 115
speciosus 98
speciosus 106(2), 117, 118
spectabilis 103
spicatus 115
spicatus 96, 109(2)
spilanthus 106(3)
spiralis 106, 121
splendens 101, 102, 115
splendens 106, 109
splendidus 115, 153
spofforthianus **153**
Sprengelianus 109
Staudtii 103, 115
stenophyllus 103, 115
stenophyllus 109
Sternii 153
stoloniferous 109
striatus 100, 105, 115
striatus 106, 109(2)
strictiflorus 109
strictus 99, 115
strictus 106, 109
suaveolens 98, 106
subaphyllus 103, 115

Gladiolus (*continued*): PAGE

subbiflorus 106
subulatus 103, 115
subulatus 109
sulcatus 106
sulphureus 102, 115
sulphureus 109, 111
sylvestris 122(2)
tabularis 99, 115
tabularis 106
Taubertianus 103, 115
Taylorianus 106
telifer 106
Templemanii 106
tenellus 97, 99, 106, 115
tenuiflorus 106
tenuis 100, 115
tenuis 106(2)
testaceus 109
Thomsoni 102, 115
Thunbergii 106, 109
tigrinus 106
trichonemifolius 98, 99, 104, 105, 115
trichostachys 103
tricolor 115, 121
trimaculatus 98, 106, 128
triphyllus 115, 121
triphyllus 106
triste 155
tristem 96
tristis 97(2), 99, 106, 115, **121**, 125(3), 128 **144**, 155
concolor 104, 115, **121**, **144**
tristis 106(2), 119, 121
grandis 119
punctatus 120
triticeus 109
tritoniaeformis 103
tritonoides 103, 115
tubatus 109
tubiflorus 109
tubulosus 109(2)
turicensis 133, 153
tyger 154
Tysoni 101, 115
uhehensis 103, 115
undulatus 98, 101, 104(2), 106, 107 115, 125, 155, 156
undulatus 106(2), 118
unguiculatus 102, 104, 115
uniflorus 106
utrinque floridus 124
flore rubro 124
floribus albis 124
venosus 109
ventricosus 107
venulosus 103, 115
Verdickii 103, 115
versicolor 97, 107, 119, 154
vexillare 103
Victorialis **133**, **153**
villosiusculus 107
villosulus 109
villosus 96, 97, 98, 100, 105(3), 106(3), 107, 116
villosus 109(2)
vinulus 107
violaceus 107, 120
viperatus 97, 107
virescens 107
viridis 97, 109
vitriacensis **135**, **153**
vittatus 100, 105, 106, 107, 116
vittatus 107
vomerculus 98, 99, 105, 106, 116
Watsonioides 109
Watsonius 97, 105, 154
Watsonius 109
Welwitschii 102(2), 107
Whytei 103, 116
Wilhelmus 156
Willmoreanus **129**, **153**
Woodii 99, 116
xanthospilus 109

Gladiolus (*continued*): PAGE
zambesiacus....102, 116
zanguebaricus.... 116
Hebea:
galeata.... 117
Hesperantha:
radiata.... 108
Homoglossum:
lucidor.... 108
Ixia:
amoena.... 109
Burmanni.... 107
fragrans.... 108
paniculata.... 108
speciosa.... 107
Lapeyrousia:
compressa.... 107
Fabricii....107(4)
fissifolia....107(2)
juncea....107(2), 108(4), 109
silenoides.... 109
Lomenia:
borbonica.... 108
Melasphaerula:
graminea....97, 107, 108
Meristostigma:
laxa.... 108
Moraea:
ramosa.... 108
Salemoneus:
biflorus.... 107
Sphaerospora:
imbricata.... 121

Synnotia: PAGE
bicolor....107, 109
galatea.... 107
Tritonia:
Bakeri.... 109
crispa....107, 108(2)
crocata.... 107
flava.... 107
lineata....108, 109
pallida.... 108
paniculata.... 108
Pottsii.... 108
rosea....107, 109
securiger.... 109
viridis....97, 109
Watsonia:
aletroides....107, 108
brevifolia....107, 109
humilis....107, 108, 109
inerianus.... 109
iridiflora.... 108
Lamarckii....108, 109
marginata.... 108
meriana....107, 108(2)
natalensis.... 120
plantaginea....97, 107, 108(2), 109
punctata....107, 108, 109(2)
recurva.... 120
rosea....107, 108, 109
spicata....96, 107(2), 109(2)
stricta.... 109

GROUPS OF VARIETIES

PAGE
Burbank's.... 159
Cayeux et Le Clerc's....134, 135, 153
Childs'.... 146
Cole's.... 129
Craft's....157, 158
Domage's.... 130
Duval's.... 130

PAGE
McTear's.... 157
Richards'.... 157
Sladden's.... 132
Standish's.... 131
Truffaut's.... 130
Verdier's (Eugène).... 131
Vick's.... 159

HORTICULTURAL TYPES

PAGE
Bellona.... 144
Cardinalis inflatus.... 128
Childsii hybrids....133, 145, 160
Dracocephalus hybrids.... 147
Early, or Precoces.... 148
Excelsior.... 148
Express.... 148
Giant-flowered Hybrids.... 134
Glaïeuls à épi rond.... 134
Glaïeuls hâtifs Ponts-de-Céais.... 135
Glaïeuls precoces.... 148

PAGE
Langprim.... 135
Lemoinei hybrids....133, 150
Nanceianus hybrids.... 133
Praecox.... 151
Precoces.... 148
Princeps....140, 151
Purpureo-auratus hybridus Froebeli.... 132
Ruffled gladioli.... 160
Victorialis.... 133, 153
Wellington....129, 154

GROWERS MENTIONED

PAGE
Allen, C. L.... 158
Baker, J. G.... 134
Barnes & Washburn.... 158
Barr....145, 148
Baumann, Eugene A.... 158
Beddinghaus....128, 149, 153
Borde, Roger de la.... 134
Brunelet....130, 133
Buist, R.... 155
Bull, William....140, 143
Bunyard, George.... 145
Burbank, Luther.... 159
Carolus, Henri....127(2)
Cayeux et Le Clerc....134(2), 135, 153
Childs, John Lewis....146, 160
Clark, J. W.... 157
Cole....129, 154

PAGE
Colville....125, 146, 150
Comley, James.... 157
Courant.... 130
Cowee, Arthur....160(2)
Craft, George....157(6), 158
Crawford, Matthew....159, 160
Curtis & Cobb....158(3)
Cushing.... 155
Dael.... 143
Dammann & Co....133, 144, 153
Deleuil.... 133
Domage.... 130
Dreer, Henry A.... 158
Duval.... 130
Fox, Francis.... 143
Froebel....133, 153
Godefroy-Lebeuf....133, 145

PAGE
Graffer 139
Groff, H. H ..... 160(2)
Haage & Schmidt 133
Hallock & Son 159
Hallock, V. H 146
Harrison, Richard 143
Henderson, Peter 153
Herbert, William ..... 126, 147, 149, 151(2) 152(2), 153(3), 155
Hogan, John 157
Hooker 130, 145
Houtte, Louis van ..... 128, 149(3)
Hovey & Co 155, 156
Hyde, J. C. F 157, 159
Jacques 139
Kelway, James 132, 135
Kirk, Sir John 143
Krelage, E. H 133, 150
Kunderd, A. E 160
Landreth, D 155
Last, J. F 143
Leichtlin, Max 133, 145
Lemoine, Victor ..... 132, 133, 135, 147(2), 150, 151
Lewis & Mackie 139
Lockhart, T. & C 128
Lucombe Pince & Co 150
Ludwig, Baron von 155
McLaren, A ..... 157(2)
McMahon, B 154
McTear, James ..... 157(5)
Makoy, Jacob ..... 150, 153(3)
Malet, A 130
Masson 138
Miller ..... 145(2), 149
Miller, Philip ..... 125, 138, 144(2)

PAGE
Parkman, Francis ..... 157(4)
Pince (Lucombe) & Co 150
Porcher-Dionneau 135
Prince, William 154
Rand, E. S., jr 156, 157
Reinwardt 143
Richards, J. S ..... 157(7)
Rifkogel 127
Roemer, Frederick 151
Rosseels 127
Sander, C 147
Saunders, Wilson 141
Sladden, J 132
Souchet, Eugène 130, 158
Souillard 130, 133
Spooner & Co 158
Spooner, W. H 157
Sprenger 134
Standish, John 131, 140
Strong & Spooner 158
Strong, W. C ..... 157(4)
Such, George 158
Thorburn, Grant ..... 134, 155(3)
Torcy-Vaunier 133
Trefoux 133
Truffaut fils 127, 130
Tubergen, C. G. van, jr 148
Van Fleet, W 140, 151
Vaughan 152
Veitch & Son 151
Verdier, Eugène 131
Vick, James 158, 159
Washburn & Co 158
Wilder, Marshall P 155
Youell, Henry 145